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ON THE CULTIVATION OF THE GONOCOCCUS FROM CASES OF GONORRHŒA, OPHTHALMIA PURULENTA, AND PYOSALPINX.

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The occurrence of a peculiar diplococcus in the pus of gonorrhœa and ophthalmia purulenta was first pointed out by Neisser[1] in 1879, and named by him the gonococcus. Since that time a great many investigators have studied this organism and its occurrence in various inflammatory processes. The results of this work have fully confirmed the opinion of Neisser, that the gonococcus is the cause of gonorrhœa and ophthalmia purulenta, and have further shown that it is to be found in the vulvo-vaginitis of children, in a certain proportion of cases of pyosalpinx and in some other inflammatory conditions of the genital organs of the female, as well as in some of the cases of endocarditis and arthritis secondary to gonorrhœa in the male. On account of the fact that the ordinary culture media are not suitable for the cultivation of the gonococcus, and because of the difficulty of preparing the special media required for its growth, most of this work has consisted solely in the microscopical study of stained preparations, the recognition and identification of the organism being rendered possible by its morphology, staining reactions, and position inside of the leucocytes.

While the positive identification of the gonococcus can probably be made by a practised observer, in most cases, from these considerations, yet as a method of investigation it is inadequate for at least two reasons:

first, because other cocci which resemble it may be mistaken for it; and, second, because it may be present, but escape observation.*

To confirm and supplement the results obtained by the microscope, the need of an easily prepared culture medium, upon which the gonococcus will readily grow, has long been felt, for by the aid of culture methods the presence or absence of this organism in pathological conditions and its identity might be determined with the same degree of accuracy as is done in the case of other bacteria.

The cultivation of the gonococcus has been attempted by a number of bacteriologists, few of whom have succeeded in obtaining undoubted cultures of it. The first to cultivate it was Bumm,[2] who obtained cultures on coagulated human blood-serum from the pus of gonorrhœa and ophthalmia purulenta. This investigator was also the first to produce a gonorrhœal urethritis by inoculation from a pure culture, and thus to prove beyond question the etiological significance of the gonococcus.

Wertheim[3] improved the culture method of Bumm by using a mixture of nutrient agar and human blood-serum, upon which the gonococcus was found to grow more vigorously than on the blood-serum alone. The blood-serum was obtained under aseptic precautions, and mixed with melted agar at a temperature of 40° C. In this way he was enabled to prepare plate cultures, and thus to study easily the appearances of the colonies of the organism. It was cultivated by Wertheim from the pus of seven cases of pyosalpinx, two cases of ovarian abscess, and one case of peritonitis secondary to pyosalpinx. The identity of the coccus thus isolated was proven by the production of characteristic urethritis from the inoculation of the cultures from three of the cases. It also grew on media prepared with ox blood-serum, but the growth was less vigorous than on the media containing the human serum.

By the use of the method of Wertheim, Gebhard,[4] Risso,[5] and Menge[6] have also cultivated the gonococcus from gonorrhœal processes. Steinschneider[7] modified Wertheim's media by the addition of sterile urine to the agar and blood-serum mixture. Sterile human serum was used, which was obtained by venesection under aseptic precautions. The organism was cultivated from the pus of gonorrhœa, and its virulence demonstrated on the human urethra.

In all these media, blood-serum, preferably human blood-serum, free from bacteria, is an essential constituent. This fact has hitherto prevented the general use of any of them in the study of infections with the gonococcus, because of the great difficulties, not only of obtaining human blood in sufficient quantities, but also of obtaining the serum of

* In many cases the staphylococcus pyogenes may occur in purulent collections in the form of diplococci enclosed in cells, and, while not agreeing in all respects with the gonococcus, may closely simulate it. Streptococci may also appear in the same way. In some cases so few organisms may be present that repeated cover-slip examinations may fail to reveal them.

either human or animal blood in sterile condition. Still more impracticable is the use of the plover's egg albumen of v. Schrötter and Winkler,[8] the knee-joint effusion of Aufuso,[9] and the ovarian-cyst fluid of Menge,[10] by means of which the writers named have cultivated the gonococcus. It has also been stated that a slight growth on plain agar and on glycerin-agar has been observed by Wertheim,[3] and this observation confirmed by Günther[11] for the latter medium. These observations seem, however, to be exceptional.

Following in general the method of Steinschneider, during the first six months of 1894 the writer has cultivated from seven cases of gonorrhœal urethritis, eight cases of ophthalmia purulenta, four cases of pyosalpinx, and from one case of vaginitis in a child, a coccus which is in all respects identical with the gonococcus in its morphology, staining reactions, and cultural peculiarities. Although the effect of the inoculation of the human urethra with this coccus has not been tried, yet the organism is held to be the gonococcus for the following reasons:

First. The microscopical examination of the pus, made in most of the cases from which cultures were obtained, showed the presence of typical gonococci inside of leucocytes, and as the only or prevailing organism present.

Second. The growth, on the special media, from such pus, of colonies unlike the colonies of other pyogenic cocci; these, on microscopical examination, were seen to be made up of diplococci like gonococci in their mophology and mode of division.

Third. The fact that these cocci were decolorized by Gram's method of staining, which is a very characteristic peculiarity of the gonococcus.

Fourth. The failure, as a rule, of this coccus to grow on glycerin-agar when transplanted on to this medium from colonies which developed on the special medium; the gonococcus, according to the best authorities, either not growing at all or but to a very slight extent upon agar.

Fifth. The occurrence of one and the same coccus in all of a considerable number of cases of gonorrhœal infection.*

METHODS. The culture medium used was essentially that of Steinschneider, consisting of a mixture of urine, blood-serum, and nutrient agar. This mixture was contained in test-tubes in the form of "slants."

* Since this paper was written Turro has reported in the Centralblatt für Bakteriologie und Parasitenkunde for July 2, 1894, the cultivation of the gonococcus on acid gelatin. The writer has not been able to confirm this.

No growth has been observed in the acid gelatin prepared according to Turro's directions and inoculated from colonies of the coccus here described. The same negative result has followed the inoculation of the organisms into agar rendered slightly acid by hydrochloric acid. In this connection it may be stated that Dr. William Royal Stokes, Resident Assistant Pathologist of the Boston City Hospital, has recently succeeded in isolating from gonorrhœal urethritis the same coccus described in this paper by the use of the coagulated blood-serum mixture of Lœffler rendered slightly acid. This medium is coagulated by dry heat in test-tubes in the form of "slants," and sterilized by steam, as in the case of ordinary culture media.

The method of preparation of the medium, however, differs from Steinschneider's in that, instead of collecting the blood-serum and urine under aseptic precautions and preventing their contamination, these constituents were collected without any special care whatever, and were freed from bacteria by filtration through unglazed porcelain. This filtration has been found to be perfectly feasible, and greatly lessens the amount of labor and skill required in preparing this culture material. Both human and ox-blood blood-serum have been employed, the latter evidently serving quite as well as the former. The details of the method are as follows, although they have been departed from at times in non-essential particulars:

A litre of nutrient agar (beef infusion) is prepared in the usual manner, and after filtration is evaporated to about 600 cc. This concentration is desirable, so that, after the dilution with the urine and serum, the medium may be sufficiently firm. This concentrated agar is then run into test-tubes, and the whole sterilized by steam three times. The quantity of agar placed in each tube is smaller than is usual, in order to allow for the subsequent addition of the urine and serum.

The blood-serum, which need not be free from corpuscles, is first passed through white sand, which is supported in a funnel by filter-paper, in order to remove as much as possible any particles in suspension, and is then mixed with half its volume of fresh urine. The mixture of urine and blood-serum is next filtered by suction through an unglazed porcelain cylinder into a receiving flask, such as chemists use for similar purposes, by means of a water-vacuum pump.

This frees the mixture from bacteria.

The usual precautions are, of course, taken to prevent the contamination of the filtrate, such as the previous sterilization by steam of the cylinder and receiving flask, besides others which will occur to any bacteriologist.

The greatest difficulty which has been encountered has been the slowness of the filtration through the porcelain. This has been very satisfactorily overcome, however, by the use of a cylinder manufactured by the Boston Filter Company, through which the mixture of urine and serum passes rapidly.

To the agar in each test-tube, which is fluid and of a temperature of about 40° C., there is added about one-third to one-half its volume of the filtered mixture of urine and blood-serum. This is conveniently accomplished by pouring the mixture from the receiving flask through the lateral tube, inserted near its neck, directly into the tubes. The melting of the agar is best effected in the steam sterilizer in order that any organisms which have found lodgment in the cotton plugs of the tubes may be destroyed. When the agar is melted it is cooled and kept fluid by placing the tubes in a water-bath at 40° C. Each tube, after

the addition of the urine and serum to the fluid agar, is quickly shaken to assure a good admixture, and is then placed in a slanting position to allow the agar to become solid, and thus to form a slant. When the medium in the tubes has solidified the tubes are placed in the incubator for about twenty-four hours to test for contaminations, after which they are ready for use.

Over the surface of the culture medium thus prepared a small quantity of the pus is distributed and the culture placed in the incubator for development. At the same time a stained cover-slip preparation of the pus was examined in most of the cases. In some cases the material for examination has been secured and brought to the laboratory on a "swab," which consists of a piece of absorbent cotton wound on the end of a piece of stiff wire. This is carried about in a test-tube in which it has previously been sterilized by dry heat.

Biological Characters of the Gonococcus. After twenty-four hours in the incubator the colonies of the gonococcus appear on the urine-serum-agar as grayish, semi-translucent points, a fraction of a millimeter in diameter.

After forty-eight hours they may be about one millimeter or so in diameter, slightly elevated, with a rounded outline, grayish in color, and by transmitted light semi-translucent. By reflected light their surface has the appearance of frosted glass. Later, if few in number, so that their growth is unimpeded, the colonies may attain a diameter of two millimeters or more, become thicker and denser, with a faintly-brownish tinge about their centres and a slightly irregular outline.

Under a low power of the microscope a fully-developed colony is seen to consist of a generally circular expansion, with thin, translucent, smooth, sharply-defined margin, but becoming brownish, granular, and thicker toward the central portion, which is made up of coarse, granular, brown-colored clumps closely packed together.

The appearances coincide with the figure of such a colony given by Wertheim.[3]

In daughter cultures the colonies become confluent along the line of inoculation on the surface of the medium. As has been pointed out above, one of the important characteristics of the gonococcus is its inability to grow on nutrient agar, although some observers have noted a minimal development on this medium.

In the present work the growth, on glycerin-agar, of the coccus here described has been tested by transplantation from the colonies in a majority of the cases in which it has been cultivated. With two or three exceptions, in none of these cases was any development on the agar obtained. In the exceptional cases the growth which appeared was very scanty.

When transplanted onto coagulated ox-blood-serum (Löffler's mixture

sterilized by steam) the organism grows in the form of minute colonies. This medium is not, however, to be regarded as suitable for its cultivation.

In morphology the coccus which has been cultivated from the cases detailed below is identical with Neisser's organism.

Under the microscope, in stained preparations from cultures, it appears as a diplococcus, somewhat larger than the other pyogenic cocci, composed of two hemispheres separated by a narrow unstained interval. Frequently two of these hemispheres are seen lying side by side in the manner of tetrads, and showing clear evidence that division occurs in two directions at right angles to each other.

As was first shown by Roux,[12] an important characteristic of the gonococcus, which has been alluded to above, is the fact that it is decolorized when treated by Gram's method of staining. In this it differs strikingly from other pyogenic cocci. The coccus here described has been found to lose its color in every instance in which it has been treated according to Gram's method, and this has been done in every case in which it has been cultivated.

The duration of life of the organism in cultures seems to be variable, apparently depending largely upon the quality of the culture medium used.

Although no extensive studies have been made of this point in the present work, yet, in general, it may be said that it seems to lose its vitality in cultures more rapidly than do the other pyogenic cocci, growth from a colony a week old or even less being uncertain. Wertheim, however, notes that a culture more than six weeks old retained its vitality, while Bumm found that the ability to grow in daughter cultures was lost after a few days.

GONORRHŒA. Most of the cultures from gonorrhœal urethritis have been secured through the coöperation of Dr. Abner Post, of Boston, at whose suggestion the experiments in the cultivation of the gonococcus were undertaken.

The writer is under many obligations to Dr. Post for the active interest which he has shown in the work. Of other cultures one was obtained from a case in the practice of Dr. W. H. Prescott.

From the pus of seven cases of acute gonorrhœal urethritis in the adult male characteristic colonies have been cultivated, which on microscopical examination were found to consist of cocci identical with gonococci in their morphology and decolorizing by Gram's method of staining.

The microscopical examination of the pus made in five of these cases showed the presence of the gonococcus in each as the prevailing or only coccus present. The colonies in five of the cases were numerous, being thickly crowded together over the surface of the medium. In one case they appeared in moderate numbers, and in another case but three

colonies developed. In this last case very few gonococci were to be seen in the cover-slip preparation of the pus.

Other bacteria have also developed in these cultures, but their colonies are usually much smaller in number or develop more slowly than those of the specific cocci, so that they have caused but little annoyance.

Only cases of gonorrhœa of recent origin seem to be suitable for obtaining cultures of the gonococcus. Cases which have persisted for a considerable time are unfavorable for the growth of discrete colonies of the organism, because of the comparatively great number of rapidly-growing bacteria of various kinds which overgrow the surface of the medium.

It is worthy of note that one of the cases from which numerous colonies developed was certainly acquired through active pæderasty.

In addition to these cases of urethritis, through the kindness of Dr. James M. Jackson, a culture has been obtained from a case of vaginitis in a child of nine years of age. There had been a purulent discharge from the vulva during about a week before being seen by Dr. Jackson, who found the vulva inflamed and red, hymen injected but intact, and on opening the vagina a considerable amount of yellow pus exuding. No history of contagion or *stuprum*.

Microscopical examination of the pus showed numerous cocci resembling gonococci as the prevailing organism, only a few of which were seen inside of the leucocytes.

A small amount of the pus was spread over the surface of the urine-serum-agar "slant." On this, after twenty-four hours in the incubator, very numerous minute grayish, semi-translucent colonies appeared. These, on microscopical examination, were found to be composed for the greater part of cocci resembling gonococci in morphology, and apparently undergoing division in two directions. They were decolorized by Gram's method of staining. A few pneumococci-like bacteria were also present, but in inferior numbers.

From the culture two glycerin-agar tubes were inoculated. After some days in the incubator no growth at all could be seen in one of the tubes, while in the other it was doubtful from the appearances whether there had been any growth or not.

Ophthalmia purulenta. The gonococcus was first cultivated from this disease by Bumm,[3] and since, Gebhard[4] and Menge[6] have each cultivated it from single cases. In the present work it has been cultivated from eight cases.

Through the kindness of Dr. Henry H. Haskell, Resident Ophthalmologist of the Massachusetts Charitable Eye and Ear Infirmary, cultures have been obtained from five cases of ophthalmia. The writer is indebted to Dr. Haskell for some of the clinical notes on these cases:

Case I.—Child, aged six years, entered Massachusetts Charitable Eye and Ear Infirmary with history of sore eyes for about two weeks. Lids œdematous, profuse purulent discharge. Conjunctivæ of lids and globe much injected and chemosed. Cornea clear and not affected. Steady improvement under treatment. Clinically the case was doubtfully specific. Source of infection unknown. After two weeks discharge had ceased, no œdema of lids, no chemosis of conjunctivæ, globe white. Discharged.

On the seventh day after admission a culture was taken from the pus, and a moderate number of minute grayish semi-translucent colonies developed on the *urine-serum-agar*. These were found to be made up of cocci like gonococci in morphology and mode of division, and were decolorized by Gram's method of staining.

No growth from transplantation on glycerin-agar after some time in incubator.

A second culture was taken two days later, in which rather numerous colonies of the same coccus developed. In the appearance of its colonies, in its morphology, mode of division, and staining peculiarity, it was identical with the coccus which grew in the first culture.

No growth when transplanted onto glycerin-agar after three days in incubator.

No organisms were found in a cover-slip preparation of the pus of the second culture, stained by Gram's method, as was to be expected from the fact that the gonococci were decolored, if present.

If ordinary pus organisms had been present, they would have been stained, and therefore rendered visible.

A third culture was made, after another day, from the cloudy, watery discharge which was then occurring. Microscopical examination of this pus in a preparation stained in the ordinary way showed leucocytes and cocci like gonococci. No typical phagocytosis was seen. A few colonies of the same appearance, and made up of the same coccus as in the other cultures, developed on the surface of the culture tube. This coccus was like the gonococcus in morphology, mode of division, and reaction toward Gram's method of staining.

Transplanted onto glycerin-agar it failed to grow.

Case II.—Boy, aged ten years, entered the Massachusetts Charitable Eye and Ear Infirmary with a history of sore eyes for ten days. Purulent discharge, not abundant. Lids œdematous, conjunctivæ of lids and globe much chemosed and injected. Corneæ not affected. Steady improvement under treatment.

Discharged after about a week with eyes in good condition. Clinically the nature of this case was doubtful. Source of infection unknown.

On both the third and fifth days after entrance a culture was made from the pus.

In each tube numerous characteristic colonies of cocci developed, together with a few colonies of other bacteria in one of the tubes. The coccus grown on each occasion was like the gonococcus in morphology, mode of division, and reaction toward Gram's method of staining. Transplanted onto glycerin-agar there was no development in the case of one of the cultures, and in the other there grew two small colonies of the coccus.

A cover-slip preparation of the pus in this case showed typical gonococci, which were decolorized by Gram's method of staining.

CASE III.—Female, aged twenty-five years, married. Entered the Massachusetts Charitable Eye and Ear Infirmary with history of sore eye for about a week previously. Only one eye affected. Œdema of lids. Conjunctivæ of lids and globe much chemosed. Cornea perforated. Abundant purulent discharge. Infection from husband almost certain.

Two days after admission a culture was made from the pus, and at the same time a cover-slip preparation. The cover-slip preparation, stained in the ordinary manner, showed a few typical gonococci in leucocytes.

In the culture numerous characteristic colonies developed, along with a few other colonies.

The numerous colonies were composed of cocci like gonococci in their morphology, mode of division, and reaction toward Gram's method of staining, which did not grow when transplanted onto glycerin-agar.

CASE IV.—Infant. Massachusetts Charitable Eye and Ear Infirmary. Thick, purulent discharge from eyes; cover-slip preparation of the pus stained in the usual manner showed typical gonococci in leucocytes. No other bacteria noted as present. Stained by Gram's method the gonococci were seen to be decolorized.

In the culture made from the pus there grew very numerous characteristic colonies of cocci like gonococci in their morphology, mode of division, and reaction toward Gram's method of staining.

The coccus did not grow when transplanted onto glycerin-agar and ept in the incubator for some days.

CASE V.—Infant. Massachusetts Charitable Eye and Ear Infirmary. Purulent discharge from eyes. A culture from the pus developed numerous characteristic colonies of cocci, which were like gonococci in their morphology, mode of division, and reaction toward Gram's method of staining.

In a transplantation onto glycerin-agar, after forty-eight hours in the incubator, a very slight growth was noted. A few other colonies also grew from the pus.

CASE VI.—St. Elizabeth Hospital. The writer is indebted to Dr. James M. Jackson for this case and its history.

Female, aged fourteen years, abundant discharge of thick, creamy pus from one eye. Duration of disease but a few days at the time the material for cultures was secured, although there was a history of a sore eye for a month. Infant in family said to have had ophthalmia.

In the culture from the pus there developed numerous characteristic colonies of cocci, which were like gonococci in their morphology, mode of division, and reaction toward Gram's method of staining. They did not grow when transplanted onto glycerin-agar which was kept three days in the incubator.

No microscopical examination of the pus was made.

CASE VII.—Boston City Hospital. Infant, discharge from eyes of thick, yellow pus. A cover-slip preparation of the pus, stained in the usual manner, showed the presence of gonococci.

In a culture from the pus there developed about fifteen characteristic colonies of cocci, which were like gonococci in their morphology, mode of division, and reaction toward Gram's method of staining.

But one colony of another organism developed.

There was no growth of these cocci transplanted onto glycerin-agar after they had been forty-eight hours in the incubator.

CASE VIII.—Boston City Hospital. Infant, purulent discharge from eyes.

But few gonococci were found in the pus by microscopical examination. In the culture from the pus only two colonies developed. These seemed to be gonococci on microscopical examination, and were decolorized by Gram's method of staining. It is uncertain whether they grew on glycerin-agar or not.

PYOSALPINX.—The close etiological connection between certain of the inflammatory conditions of the pelvic organs of the female and gonorrhœa was first clearly pointed out by Noeggerath,[13] on clinical grounds alone, in 1872, and has been generally admitted for some time.

In pyosalpinx, gonococci were first observed with the microscope by Westermark,[14] in 1886.

By the microscopical examination alone they have since been found in salpingitis by Orthmann[15] in one of eight cases, by Schmitt[16] in one case, by Steman[17] in one case, by Menge[18] in three of twenty-six cases, by Zweifel[19] in eight of forty-four cases, by Reichel[20] in one case, by Döderlein[21] in one case, and by Wertheim[5] in nine of twenty-four cases. In addition to these cases, Wertheim[5] has isolated it in cultures from seven cases, and Menge[10] from one case also. In all, about one hundred and eight cases have been recorded in the literature, which have been examined for the presence of gonococci, either by the microscope or by cultures, and in thirty-four cases, or 31 per cent., this organism has been found. Sixty-one of the cases were sterile or free from bacteria, and in but eleven of the one hundred and six cases were other bacteria than gonococci present.

In the present work gonococci have been demonstrated by cultures in four out of about twenty cases of pyosalpinx, or in about 20 per cent. Excluding one specimen, which had been in communication with the sinus in the abdominal wall, and another, in which there was tuberculosis, the contents of all the negative tubes were free from bacteria, both by cultures and by microscopical examination.

This result is in harmony with the experience of others referred to above. A large part of the material for study has been obtained through the kindness of Dr. James M. Jackson of the staff of St. Elizabeth Hospital, for which the writer desires here to make acknowledgment. The cases of pyosalpinx from which gonococci were cultivated are as follows:

CASE I.—Operation at St. Elizabeth Hospital, specimen brought to laboratory by Dr. Jackson. Tube enlarged and containing a considerable amount of thin pus. Cover-slip preparations of the pus showed the presence of gonococci, not numerous, but easily found. On the surface of the culture made from the pus there developed probably sixty characteristic colonies which were made up of cocci like gonococci in their morphology, mode of division, and reaction toward Gram's method of staining.

CASE II.—Operation at St. Elizabeth Hospital, specimens brought to laboratory by Dr. Jackson. One tube very much enlarged and tortuous and distended with pus. The other tube is smaller and also contains pus. Cover-slip preparations of the pus from the larger tube were negative for bacteria, but in one from the smaller tube one or two leucocytes containing gonococci were seen.

Four or five cultures were taken from the contents of these tubes, in all of which a moderate number of characteristic colonies developed. Transplantations from these colonies into four glycerin-agar tubes resulted in no growth.

CASE III.—Operation by Dr. Burrage at the Carney Hospital. Both tubes contained pus. In the pus of one of them gonococci were seen by the microscope. In a culture made from the pus of one of them three or four characteristic colonies and one or two fluorescent colonies developed.

The characteristic colonies were composed of cocci, like gonococci in morphology, which were decolorized by Gram's method of staining.

CASE IV.—Operation by Dr. Mixter. The walls of the tubes were somewhat thickened and there was a small amount of pus in the interior. In a culture made from the pus a moderate number of characteristic colonies of cocci developed. These cocci were like gonococci in their morphology, mode of division, and reaction toward Gram's method of staining.

No growth in a transplantation onto the glycerin-agar after forty-eight hours in the incubator.

A cover-slip preparation from the interior of the tube made after the specimen had been about one day in Müller's fluid was negative for bacteria.

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CYLINDROMA ENDOTHELIOIDES OF THE DURA MATER CAUSING LOCALIZING SYMPTOMS AND EARLY MUSCULAR ATROPHY.

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Spreading paralysis on the right side, commencing in the shoulder; Jacksonian epilepsy; absence of all the classical brain tumor symptoms; early amyotrophy without spinal lesions; change of electric reaction; operation; death.—(Dr. Carson.) P. McH., aged forty-six years, born in Ireland, resident of Kansas, occupation horse-trainer, gives the following history:

General health always good with the exception of chills and fever at various times six or seven years back. Always led an active life, and excelled in athletic sports. A little more than a year before the beginning of the present trouble he was thrown from a buggy and dragged about thirty yards. Was not conscious at the time of an injury.

One day, about six months before presenting himself for treatment, he noticed a weakness in the right shoulder, when, with some companions, he attempted to vault a fence. On repeated examinations he found that, while the shoulder and arm were decidedly weak, the elbow-joint and wrist were still performing their functions, and the grip of the hand and the movement of the fingers were not impaired. One month later the arm became so weak and unsteady, and a few weeks later the grip of the hand so unreliable, that he was compelled to discontinue shaving himself. The whole arm and hand felt at times numb (sleepy), and the arm seemed smaller. At this time he sought medical advice from a local physician. Treatment (chiefly bromides and galvanism) was of no avail, and was, therefore, soon abandoned. For several months the impairment of power and the "numbness" continued to increase.

Electrical treatment was resumed by his physician, the faradic current being applied to the affected member. This application was immediately followed by a spasm commencing in the index and middle fingers, which were flexed upon the palm, the thumb being thrown into the palm; then the spasm extended to the wrist, flexing it; then to the arm, flexing it and drawing it near to the chest. All of the flexed muscles of the fingers, hand, forearm, and arm to the shoulder were involved. The spasm was unattended with loss of consciousness, lasted about two minutes, and resisted all attempts at reduction. Such attempts caused much pain and had to be discontinued. The arm remained absolutely useless for at least an hour afterward, when it gradually resumed its former condition.

Again, during the afternoon of the same day, he had a second spasm, a counterpart of that in the morning. During the time that elapsed from the first attack to his entrance into the hospital, about three months, he had at varying intervals nine spasms of different intensity, but in all essentials like the first one. Some of them, he thought, had been

shortened by forcibly extending the fingers, their starting-point, when the first indication of return was felt. Ten days before entering the hospital he had the last attack. This was more severe than any of the others, extending from the arm into the face, closing the eye, twisting the leg as it had done the arm, and lasting about ten minutes. There had been *no* headache, vertigo, nausea, pain or suffering of any kind, nor impairment of sight, nothing to indicate that his general health was failing.

Status Præsens. At the time of entering the hospital examination revealed the following conditions: Appearance robust, body well nourished; all the faculties of the mind intact; patient is intelligent, far above the average of his class; no external evidence of injury; the left side of the head slightly larger than the right, and somewhat hypersensitive a little below and anteriorly to the left parietal eminence. The right arm completely paralyzed and the right leg paretic. Measurement shows the right arm ten and one-half and the left, twelve inches in circumference. The right forearm one-half inch less than the left. The right thigh is one inch and the right leg one-quarter inch less than the left. There is slight paresis of the face on the right side. All the tendon-reflexes on the right are exaggerated and foot-clonus well marked; slight spasticity in triceps of right arm; sensation and muscle sense not at all impaired. Patient is left-handed.

Examination of the eyes made by Drs. Pollack and Wolfner, of this city, independently of each other, did not reveal any abnormalities except an engorgement of the retinal veins. Accommodation and acuity of vision were perfect. There was no choked disk. The diagnosis was: Tumor of the brain, left hemisphere, involving principally the finger, wrist, and arm-centres. Since the trouble was evidently progressive, an operation was decided upon. The absence of headache, vertigo, nausea, and choked disk could not invalidate the diagnosis, which was rendered very probable by the characteristic spreading of the paralysis and the typical Jacksonian epilepsy.

The usual preparation for aseptic operation having been made, and, after chloroforming the patient, the flap having been raised in the customary manner, a button of bone was removed with an inch-trephine from the marked point, a little behind and below the middle of a line corresponding to the Rolandic fissure. Before the bone was entirely cut through there was profuse hemorrhage, which at first was supposed to come from the dilated vessels of the diploë. Another disk was removed anteriorly and a little above the former, and the two openings thus made were united by removing the intervening bridge of bone with a chisel. The hemorrhage from the entire circumference of the cranial opening was alarming, and, in order to control it, the opening had to be packed with gauze while the rongeur forceps were being used to enlarge the operative field. The copious bleeding was subsequently found to be caused by the immense size of some branches of the posterior middle meningeal vein, which, through excessive dilatation and subsequent corrosive (osteolytic) action, had converted the grooves in the skull into deep and broad channels, and it was not until the bone, including the large vessels, had been removed that the hemorrhage could be controlled.

Upon the removal of the bone the dura bulged into the opening and presented a dark, congested appearance, being covered with many and large gorged vessels. There was neither to be seen nor felt the least

indication of pulsation. Upon attempting to raise the dura it was found to be adherent to a growth beneath, which was now plainly visible and, while it was soft and friable, was easily lifted from its bed between the dura and the apparently healthy brain. The dura, that part of it involved in the tumor, was cut out and the cavity left loosely packed with gauze, the flap replaced, and held by a fine silk-suture, the wound dressed, and the patient returned to bed in a bad condition on account of shock and the considerable loss of blood.

During the course of the operation injections of whiskey, aqua ammonia, and ether, had been administered by one of my assistants to prevent collapse.

The tumor, at the time of removal, was three and one-half inches long, three inches wide, one inch thick, and weighed fourteen ounces.

Patient seemed to be getting along satisfactorily during the first three days after the operation. There was dulness of sensation on the right side, which, however, seemed to have completely disappeared on the third day. The paralysis of the arm also seemed to improve, when, on the fourth day, the patient showed a brown, dry tongue, and was slightly delirious. Abscesses had formed at the sites of the hypodermatic injections on the right arm. They were opened, and the cavities cleaned with peroxide of hydrogen. After this the case progressed favorably until the twelfth day, when fever and a grave delirium, bordering at times on maniacal wildness, set in.

On the same day he had a spasm which involved the whole right side and left him unconscious. He never rallied from this, and died seventeen days after the operation. The temperature never exceeded 101.2°.

Remarks by Dr. Bremer.

Autopsy. The wound is united firmly throughout. The scalp appears sunken at the site of the operation. Upon the removal of the calvarium the dura mater is found strongly adherent to the bony edge of the trephine opening. The scalp is united to the underlying brain-substance (the dura having been removed at this place). No sign of a suppurative process. The dural vessels posteriorly to the operative field are congested and tortuous; the same is true of the corresponding portion of the pia. The margin of the dura is considerably thickened, and, as already stated, adheres firmly to the adjacent cerebral matter.

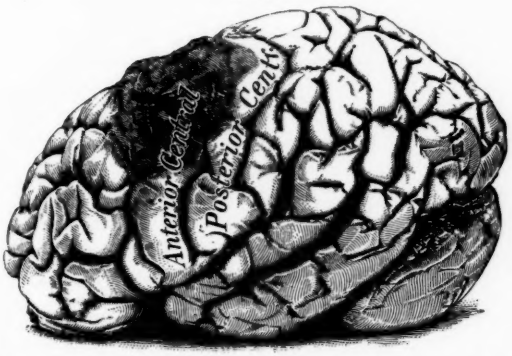
The brain surface presents an irregular, shallow defect in the nature of an erosion (Fig. 1) nearly circular in form, about two and one-half inches in diameter. It is of a pale-reddish color, and looks roughened, shreddy, and lacerated.

Toward the longitudinal sinus it is with greater difficulty than is usual under normal conditions that the dura mater can be separated from the subjacent tissue; a white mass about the size and shape of a split butter-bean is observed growing from the dura mater anteriorly to the defect. (This formation is recognized as being a remnant of the tumor which had escaped removal at the operation.)

There is a clot, not adherent, extending between the lesion and the longitudinal sinus, reaching backward over the superior parietal lobule for about two inches. The right hemisphere and the under surface of the brain do not offer any abnormalities, except that the basilar artery is greatly engorged.

The main area involved by the erosion is the greater portion of the upper two-thirds of the ascending frontal convolution and the foot of the first frontal; superiorly it commences about one-half inch from the longitudinal fissure, and extends downward to within two inches of the fissure of Sylvius. It involves the entire breadth of the ascending frontal and encroaches anteriorly on the first and second frontal convolutions, and posteriorly on the posterior ascending, which it displaces backward.

FIG. 1.



From a photograph of the brain hardened in Müller's fluid, showing the extent of the tumor. To make it appear plainer, the edges have been marked. It can be seen that the posterior central is dislocated backward. The tumor seems to reach up to the great longitudinal fissure, which, in reality, is not the case. The space between the upper margin of the tumor and the fissure is invisible, owing to the profile view.

On making a frontal incision at the site of the lesion the underlying structure on the cut surface appears reddish-brown for about an inch or an inch-and-a-half downward, shading gradually into the apparently white normal substance beneath.

The opinion prevailed at the time of the operation that the tumor had been radically removed, it being impossible to feel any remnants as far as the finger could reach with safety. Moreover, the brain seemed to be, aside from an easily comprehensible paleness and a flattened appearance of the convolutions, absolutely healthy. It was hoped, therefore, that in spite of the size of the tumor, the brain at the site of the depression would gradually resume its normal relations and functions.

This hope was not realized. Before the operation had been completed the cavity left by the removal of the tumor had been filled out by the underlying previously-compressed brain-mass, a process which, owing to its rapidity, could not very well have been accomplished without some hemorrhage into the substance of the brain.[1] Many hemorrhagic foci

[1] It seems that even the most careful handling of the healthy, or apparently healthy, brain, such as cautious palpation, is invariably attended with hemorrhage, especially into the cortical substance, owing to the extreme thinness and vulnerability of the cerebral capillaries. This I was able to demonstrate in a specimen of apparently healthy cortex excised at the "wrist-

of varying sizes were indeed found on closer examination in addition to the other changes to be described later on.

But, above all, the unremoved portion of the tumor on the visceral side of the dura would have precluded any possibility of a permanent cure, the tumor-mass gradually flattening out toward the healthy portion of the dura, and, after the manner of malignant growths, imperceptibly merging into the healthy tissue. Anteriorly to the opening in the dura the remaining mass was largest. Its thickness did not, however, taper off smoothly and evenly toward the periphery, but there was a terrace-like appearance, recalling the successive formation of the strata of ice seen around water-pumps in winter. The tumor, therefore, gave the impression of a miniature mountain planted with a broad base on the visceral layer of the dura mater.

Macro- and microscopic examination. The organs examined were the lungs, part of liver, kidneys, spinal cord, and brain. The following is the finding:

The lungs are gorged with blood. Second stage of croupous pneumonia. Liver much swollen, distinct lesions not demonstrable. Kidneys very much enlarged, cortical layer pale and thickened, medullary gorged with blood. Epithelium in many places degenerated and shed. Casts in all parts of the organ; some of them pigmented. Many hemorrhagic foci.

Spinal cord. There is macroscopically no demonstrable lesion of the cord, except a defect around the central canal, which, however, is looked upon as an artefact, due to maceration in the preserving fluid and possible rough handling during removal. Microscopically, however, this region shows a considerably greater amount of round cells around the canal than is normal, pointing to an irritating process. This extends down to the lumbar enlargement.

Very careful investigation is made as to the presence of a descending degeneration of the cortico-muscular tracts. The cervical enlargement especially is scrutinized owing to the striking atrophy of the right arm. Specimens prepared after Weigert do not show the slightest trace of any degenerative processes of the tracts mentioned nor of any nerve fibres in other fields of the section.

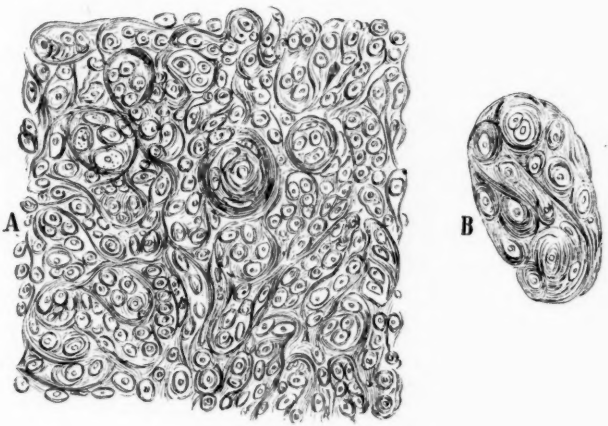
The large ganglionic cells of the anterior horns are on the whole intact, especially the peripheral ones. Some, however, of those lying more toward the centre of the horn show signs of degeneration (loss of processes and impairment of tinctorial capacity), not extensive enough, however, to account for the pronounced atrophy existing in the arm. At any rate, there is no difference in the extent of degeneration between the left and right anterior horns, which would be expected to be the case if the atrophy had been dependent on an anatomic change of the ganglionic cells. Besides, wasting of a small number of these cells nearing the age of fifty is, I think, physiologic.

centre" in a case of cortical epilepsy. Although great care had been taken by the operator, Dr. Prewitt, of this city, to avoid any undue pressure, innumerable minute capillary hemorrhages could be demonstrated microscopically throughout the excised piece of normal cortex and, to a less extent, the underlying medullary portions.

Microscopic description of the tumor. The tumor is a cylindroma endothelioides. The term cylindroma comprises a variety of tumors, and, reading up on this subject in the text-books, Ziegler's *Pathological Anatomy*, for instance, one does not get a very clear idea of the matter. By it are meant several kinds of growths having in common cylinder-like bodies of a hyaline or gelatinous nature. Most of them belong to the class of the sarcomata. So does our tumor. I have called it cylindroma endothelioides, because the tumor in the main mass and fully-matured state is an endothelioma containing the cylindroid masses mentioned. It might, in the present unsettled state of nomenclature, also be called endothelioma cylindroides or sarcomatodes, or, as we shall see directly, angio-sarcoma cylindroides.

The tumor is, indeed, somewhat of a pathologic mine of wealth. It represents an astonishing variety of the phases of sarcoma development.

FIG. 2.



Müller's fluid carmine.

A. Typical endothelioma from fully-developed portion of the tumor. (HARTNACK, 3, vi.)
B. The same with higher amplification. (HARTNACK, 3, viii.)

While, as stated before, the main mass is clearly made up of flattened or elongated cells which, after the fashion of epithelial growths, press upon each other, showing sometimes the well-known onion-like arrangement so characteristic of the epitheliomata, even the "pearl," nothing of this sort is seen in other parts of the tumor.

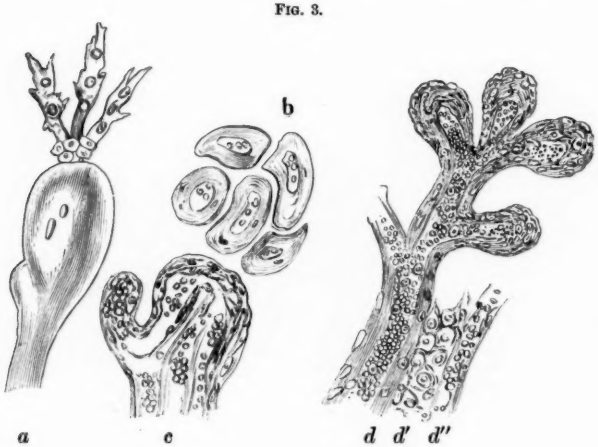
Nearly all the varieties of sarcomata may be encountered in or near the tumor-mass: the large oval-celled, net-celled, myxo- and angio-sarcoma.

The origin of the cylinder-like hyaline mass is a still debated question among pathologists. Some, I believe the majority of authors on the subject, have claimed that such originate in vessels undergoing a hyaline change. There can be no question about this in our case. The vessels are plainly seen in the process of the change. This plainness is

probably due to the fact that the tumor is of recent growth. In another tumor of the same kind which I had an opportunity of examining, and which was of several years' growth, this connection between the hyaline masses and the vessels and the tumor could not be demonstrated.

In our tumor there is not only a number of vessels undergoing this process and still showing blood corpuscles in their lumen, but the general aspect of the hyaline masses at once suggests their origin.

FIG. 3.



Isolated vessels of the tumor.

a. A vascular bud in complete hyaline degeneration; at the top some isolated net cells of the tumor proper. *b*. Cross-section of a bunch of vessels with partially hyaline walls. *c*. Cactus form of growing vessels. *d*. The same with typical buds. To the right of the vessel are cells closely packed (*d'*), and a small capillary (*d''*). Small granular hæmoglobin-containing bodies are seen in the lumen of the buds on the right.

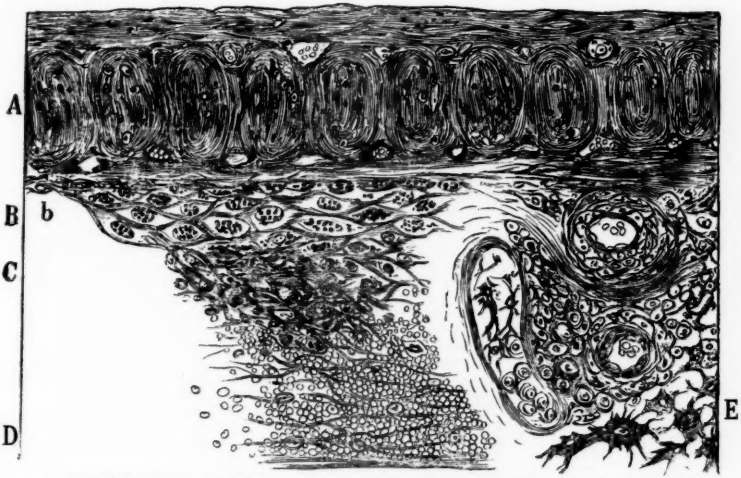
Endothelial and angiomatous beginning of the tumor. Whilst, as above stated, oval and net-celled forms are found, the chief interest centres in two genetic features encountered in the case. Since the literature on this subject is not accessible to me, and as I am wholly restricted for information to the text-books (Ziegler, Birch-Hirschfeld, Klebs), I do not know whether the facts which I am going to state have been previously observed or not.

At places quite distant from the seat of the tumor, in the dura mater, for instance, an inch from the margin of the remains of the tumor spoken of before, dural vessels are found, which show an enlargement of all of their elements. Arteries may be seen in which the endothelia and also the smooth muscle fibres are enormously enlarged. The same picture is often observed in the part of the brain which after the operation was invaded by the growth. The endothelium seems to grow more

actively, however, than the other constituents of the vessel, and soon the lumen is plugged with swelled-up endothelial cells, which in the course of time become flattened against each other.

Vaso-formative and hæmopoietic cells. Whilst thus the tumor spreads and invades the neighboring tissues by starting the endothelium of pre-existing vessels to proliferate, a different genetic factor may be observed in other parts. While examining the parts of the tumor not removed by the operation and the neighboring dura mater my attention was engaged by a vascular layer extending from the flattened tumor-remnants for a considerable distance underneath and along the dura mater.

FIG. 4.



A. Parietal (supra-arachnoidal) layer of the dura, showing a row of connective-tissue bundles cross cut. Vessels and lymph-spaces are seen along the upper and lower margins. B. Strata of pigmented cells, vaso-formative and hæmopoietic, starting from b, a piece of normal arachnoidea. C. Layer of capillary and blood transformation. D. Change to capillary angioma. E. Net-celled sarcoma from another portion of the dura. (HARTNACK, 3, vii.)

The chief interest centred in a layer of varying thickness of large spindle- or oval-shaped cells (Fig. 4) containing yellow granules. The cells gradually lose the yellow color, become larger, and on section represent a network with spindle-shaped spaces containing blood corpuscles. The spaces enlarge, and appear now as capillaries, the beginning of the sarcoma or angio-sarcoma. Those cells carrying pigmented granules seem to arise from the arachnoidea. I take them to be vaso-formative and hæmopoietic cells.

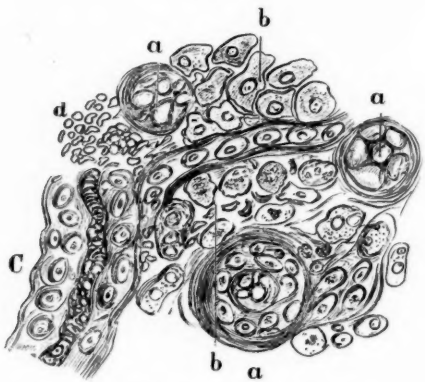
The blood, then, is formed *in loco*, together with the capillaries, a proposition which becomes at once a little more plausible and more easily

intelligible when we remember that the sarcomatous process is a counterfeit of embryonic connective-tissue formation, and that this process has been demonstrated by Ranvier in the tail of the tadpole.

In the recently-formed portions of the tumor vessels in the act of growing and new formation can be satisfactorily seen. This new formation is, of course, unlike that described for the angiomatous development from the dura and arachnoid. The walls of the vessels are thick, but transparent and frail. New vessels are formed by budding, and the new formation of blood-corpuscles seems to take place *pari passu* with that of the vessels. In these newly forming vessels, too, I have seen hemopoietic cells. They are not pigmented, however. The older hyaline vessels often resemble cactus, because of their clumsy branches. (See Fig. 3.)

The new formation of vessels and of blood in them is, however, not the only way of inaugurating the angiomatous process. In many parts of the dura I saw, besides the vascular proliferation, the filling up of lymph spaces with blood. Again, blood will take the place of solid connective-tissue, melting, as it were, the intercellular substance, whereas the cells would appear constituting meshes in which the blood circulated.

FIG. 5.



Section through the invaded portion of the brain.

a, a, a. Vessels filling with proliferating endothelia. b, b. Enlarging and proliferating cells of the neuroglia. c. Artery whose muscular coat is undergoing the sarcomatous change. A capillary vessel to the right shows the same process. d. Extravasated red blood-corpuscles, some crescentic in shape; some are seen scattered among the neuroglia cells. (HARTNACK, 3, viii.)

The changes in the brain. There is an inflammatory and a neoplastic process demonstrable in the part of the brain nearest the former site of the tumor. I have no doubt that the injection of ammonia into the

arm during the operation and the subsequent suppuration had a great deal to do with the rapidly fatal termination of the case, although it must be admitted that the post-mortem findings were such as to preclude any possibility of complete recovery.

The surface of the brain was invaded by two kinds of micro-organisms —one a large coccus, the other a short, thick bacillus with rounded ends. No cultures were made, and a diagnosis is impossible.

Besides the inflammatory changes all the varieties of sarcomatous processes could be shown in even greater variety than in the membranes. Almost every field under the microscope reveals different pictures; the pathogenic scenery is constantly changing.

The changes occurring in the other organs—lungs and kidneys—were due to the infection caused by the hypodermatic needle.

Motor or sensori-motor area. The divergence of opinions as to the true functions of the central convolutions is as wide to-day as it was fifteen years ago. The most radical assertion on the subject has of late years been made by Flechsig and Hösel,[1] who claim that the so-called motor zone of the brain is at the same time the sensory centre (resp. reflex centre) of the posterior spinal columns, on the ground of embryologic and anatomo-pathologic findings. However, from the description given by these authors, it is evident that it is principally the *posterior* central convolution which is in anatomic relation with the sensory tracts of the spinal cord, an observation which fits in well with the clinical observations of neuro-surgery. These latter speak certainly a more emphatic language than embryologic researches of anatomic findings based on cases of long standing, especially if the lesions date back to childhood, as in the case of Flechsig and Hösel (porencephalic defect of fifty-two years' standing).

Our case flatly contradicts the theory of the sensori-motor character of the Rolandic region, in the sense that every motor area is at the same time the sensory cortical termination of the corresponding segment at the periphery of the body. It is, in its bearing on the question, well supplemented by a case published by Darkschewitsch,[2] who reports a monoplegia of the right arm due to circumscribed tubercular softening of a portion of the *centrum ovale* (left side) corresponding in the main to the middle third of the posterior central convolution. There were paralysis and greatly diminished sensibility of the right arm. No atrophy. The conclusion, then, to be drawn from the findings of our case and the one just mentioned would be that, so far as the middle third of the Rolandic region is concerned, the anterior portion is exclusively motor, the posterior chiefly sensory in function. Of the two, ours

[1] Die Centralwindungen, ein Centralorgan der Hinterstraenge. Neurol. Centrbl., 1890, p. 417.
[2] Zur Frage von den Sensibilitätsstörungen bei Herderkrankungen des Gehirns. Neurol. Centrbl., 1890, p. 714.

is the more telling and pronounced, owing to the exclusive involvement of the motor function. The diagram drawn by Darkschewitsch shows an encroachment of the lesion on a portion of the anterior third of the central at about the level of the tumor in our case. The question would at once become much clearer if an exclusively sensory disturbance due to cortical lesion could be demonstrated. This, to my knowledge, has not been done so far.

Outspoken sensory disturbances were also absent in a case of a large tumor to be detailed later on, reported by Pel, and one published by Dr. Mudd.[1] In the neurologic report, which I furnished for this case (echinococcus the size of a large hen's egg growing in the Rolandic region), I forgot to mention the fact that sensibility was intact, as ascertained by Dr. Fry and myself.

Import of the localizing symptoms. The clinical report says that the first manifestation of the developing disease consisted in the sudden appearance of weakness in the right shoulder and arm, the grip of the hand and the movements of the fingers being unimpaired. This monoparesis of the shoulder and arm was not transitory, but lasting. It was, therefore, of the highest possible localizing value.

According to Putnam,[2] monoplegias and paresis are of greater localizing value than monospasms and localized convulsions. The shoulder was first paralyzed. The probability, then, is that the starting point of the tumor was anteriorly to the anterior central convolution at the junction of the foot of the first and that of the second frontal convolution (shoulder centre), and that from this point it grew and spread back-up-downward. In the sequence, as the arm, wrist, and finger centres were pressed upon, the paralysis moved from joint to joint, a striking illustration of the distinctness of the various cortical areas controlling distinct sets of muscles which are wont to work together in harmony toward executing a certain movement. The spastic seizures, however, took place in the reverse sequence, beginning in parts last attacked, viz., the fingers. This is also in keeping with our knowledge about irritative lesions and their manifestations. In the light of the clinical history, as well as considering the actual state of the patient, no importance could be attached to the fact that the spasms began in the fingers. In view of the overtowering paralysis of the shoulder, the initial spasm of the fingers was of no localizing value, and could not be looked upon as a signal symptom from an operative point of view.

Absence of optic neuritis. The percentage of the cases of intra-cranial tumors in which double optic neuritis occurs has been variously estimated. That a case of suspected brain tumor becomes at once doubtful

[1] AMERICAN JOURNAL OF THE MEDICAL SCIENCES, 1892, vol. ciii. p. 412.
[2] Intra-cranial Lesions. Transactions of the New York Medical Association, viii.

whenever this symptom, the most unequivocal and best known of intra-cranial growths, is found to be wanting, is almost an axiom in brain pathology. The strongly localizing symptoms, however, in our case could leave no doubt as to the existence of an intra-cranial tumor belonging to the minority, in which papillitis is wanting.

This is not the place to discuss the causes which lead to the production or prevention of optic neuritis in brain tumor; but it may not be amiss to point out the fact, exemplified once more in our case, that of all brain tumors not accompanied with papillitis, those of the large hemisphere and especially those occurring in the anterior portion of them, stand as to numbers at the head of the list.

Probably, also, the fact that the growth was not a brain tumor proper, and that, therefore, there was no irritating substance generated, which by some (Leber and Deutschmann), in addition to increased intra-cranial pressure, are held responsible for the production of papillitis, may partly account for the absence of this complication. Bramwell[1] remarks that in most of the cases of intra-cranial tumors in which optic neuritis is absent there is little or no evidence of increased pressure. This certainly applies fully to the case under discussion. There was neither hydrops internus nor distention of the sheaths of the optic nerves.

Absence of other classical symptoms of brain tumors. Besides optic neuritis, the strongest link in the chain of evidence establishing the diagnosis of cerebral tumor, the other characteristic symptoms were absent. There was no headache, vertigo, nausea, or vomiting, nor was there any mental hebetude or change of character.

The absence of headache in case of an intra-cranial growth of almost the size of a hen's egg may seem strange at first sight; but it becomes more plausible when it is remembered that there were no symptoms of any increase of intra-cranial pressure, notably no optic neuritis. For the same reason nausea and vomiting failed to set in, whilst vertigo is quite frequently absent in cases where the frontal region of a hemisphere is the seat of the lesion. All these symptoms were also absent in a large echinococcus cyst, reported by Mudd, and in Pel's case, referred to at another place. The spreading of the spasm to the face and mouth during the last attack of Jacksonian epilepsy showed how near Broca's convolution the disturbance had come. In spite of the relative remoteness of the tumor from this region, aphasic symptoms, by way of distant effect, would probably have manifested themselves had it not been for the fact that the patient was left-handed, and that therefore his speech-centres were on the right side of the brain. For the same reason there was no mental change, which, considering the size of the tumor-mass, would in all probability have shown itself if the patient had not been right-brained.

[1] Intra-cranial Tumors, p. 58.

Mechanism of the production of the destroying and irritating symptoms. The paralysis of the shoulder was the first symptom to set in; convulsions followed later on. This seems to be in keeping with the nature of the existing pathologic process. The pressure from the gradually-enlarging tumor caused probably at first a wasting of the underlying gray and, possibly, white substances, due principally to persistent anæmia. The discharging lesion which supervened in the course of time was probably the result of hemorrhages into the neighboring cortical and subcortical tissues.

Practical localization. Owing to the fact that a mono-paresis of the shoulder was the first symptom to appear, the inference is, that the starting-point of the dural tumor was over the shoulder-centre. Since, however, at the time the patient presented himself, the whole arm was paralyzed and involved in the spasm, the region of the skull corresponding to the middle third of the Rolandic region was selected as the site for operative interference. This anticipation was justified by the result. However, the beginning of the growth was probably at the shoulder-centre—*i. e.*, the foot of the second frontal convolution.

FIG. 6.

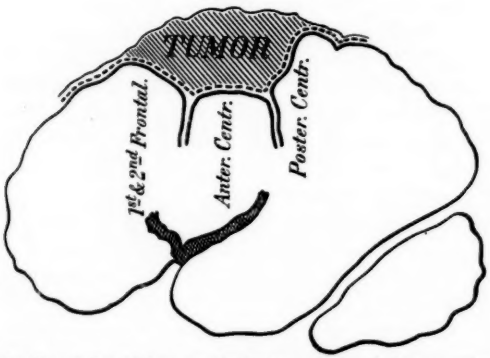


Diagram showing the relation of the tumor to the convolutions before operation. The dotted line represents the pia, the other, surrounding the tumor, represents the dura.

Statistics of cerebral muscular atrophy. There was prominent atrophy of the extremities of the left side. The muscles of the shoulder, notably the deltoid, supra- and infra-spinatus, were wasted. Muscular atrophy due to cerebral disease was first described by Todd.[1] Since then about twenty-one cases (most of them in late years, the present one included) have been registered and described, a remarkably small number considering the great prevalence of cerebral paralysis and the undoubted connection between muscular atrophy and brain lesion.

[1] Clinical Lectures on Paralysis, 1854.

Among the eighteen cases collected by Steiner[1] fourteen were due to causes other than neoplasms (hemorrhage, softening, inflammation, abscess), six were cerebral tumors, two, the last ones reported (Pel's and ours), were extra-cerebral, meaning meningeal growths.

Literature on cerebral amyotrophy due to brain tumors. Among the cases of cerebral muscle atrophy due to brain tumors I find the following mentioned in the literature: 1. Roth and Muratow,[2] glio-sarcoma gyri centr. dextr.; left arm atrophied. 2. Patella,[3] glioma corticis dextr.; left arm, small hand muscles, and left leg atrophied. 3. Quincke,[4] glioma gyri centr. dextr. utriusque. 4. Borgherini,[5] metastatic sarcoma gyri centr. sinistr. 5. Pel,[6] fibroma of meninges, over gyri centr. sinistr.

Our case would make the sixth in the literature on this subject. It may be that I have overlooked some cases, but those in which authors have laid stress on this unusual symptom are, I think, all included in this list. Probably lesser degrees of atrophy have been overlooked in similar cases. I believe that, by paying closer attention to this feature, a greater number of such cases would be recorded.

Muscular atrophy due to extra-cerebral lesion. The chief interest of our case, so far as the muscular atrophy is concerned, centres in the fact that the exciting cause was, strictly speaking, extra-cerebral; that it was a growth of the meninges and that by mere pressure, and probably wasting, of the cortex atrophy and electric change of reaction, to be spoken of later on, were brought on. There is only one case extant, published recently, in which features analogous to those observed in our case are described. Pel[7] details the history of a case in which, as in ours, the most striking, most important, and most constant symptoms of brain tumor (headache, nausea, vomiting, vertigo, optic neuritis) were absent although the brain mantle was compressed by a tumor the size of an egg. The paresis was on the right side. There was mental impairment. (It is not stated whether patient was right- or left-handed.) There was Jacksonian epilepsy, slight atrophy of the muscles of arm and leg. Complete intactness of sensibility and muscle-sense. Electric reaction normal. The tumor, about the form of a chestnut (probably horse-chestnut, as in our instance), was found over the arm-centre, flattening but not invading the convolutions beneath. It was a fibroma traversed by large lymph spaces growing from the pia mater.

Another remarkable case of early muscular atrophy, not mentioned

[1] Aus. de patholog. Inst. in Heidelberg. Deutsche Zeitschr. f. Nervenheilkunde, 1893, iii., 4. u. 5.

[2] Archives de Neurol., xxi. p. 296.

[3] Delle atrofie muscolari secondarie, Padova, 1886.

[4] Deutsch. Arch. f. klin. Med., 1889, vol. xxxv. p. 371.

[5] Borgherini: Ueber einen Fall von Muskelatrophie, Neurolog. Centralbl., 1890, p. 545.

[6] P. K. Pel: Berl. klin. Wochenschr., 1894, No. 5.

[7] Loc. cit.

by Steiner, also due to extra-cerebral lesion, is that of a traumatic injury of the skull (fissure) corresponding to the anterior half of the upper parietal lobule, reported by J. R. Logan.[1] There was, besides a paralysis of the corresponding foot and leg (exclusive of the hip), a marked atrophy of the muscles of the calf.

The question of cortico-trophic centres and their location. In all of the cases of cerebral amyotrophy reported the arm was implicated, in some instances singly (in six), in the remainder other muscles participated. In none was there an absence of the arm paralysis when it was present in other parts. The only exception was the case of Logan, which, however is not entirely unquestionable as to precise localizing value (traumatic injury). It would be premature to deduce from this fact the conclusion that somewhere near the arm-centre there is a trophic cortical centre, possibly for all the muscle groups of the opposite side. The only deduction permissible is that, as the arm is generally most affected in cases of cerebral paralysis, so muscular atrophy of cerebral origin is most pronounced in the arm, while the face and the leg may remain intact. The fact that there was absolute absence of degenerative changes of the cortico-muscular tract and the ganglion cells of the anterior horn would point to direct trophic fibres passing from some portion of the brain to the muscles. These centres, however, are, so far, only hypothetical. At all events, it is rather premature to conclude, as Luzzato (remark made by Steiner, *loc. cit.*) has done, that early atrophy in hemiplegias means involvement of the cortex.

There is at least one case in neurologica literature which points to quite a different direction.[2]

This case would tend to prove, as the title indicates, that the gyrus fornicatus is not only the centre of sensation in accordance with the experiments of Horsley and Shaefer, but also of nutrition.

This observation, however, stands so isolated that it cannot count against the mass of evidence pointing to the Rolandic region as the probable seat of the musculo-trophic centres. Still, this is as yet an obscure subject.

Amyotrophy without the customary spinal lesions. What is particularly remarkable is the fact that there was no trace of a descending degeneration of the pyramidal tracts, nor were the ganglionic cells of the anterior horn altered to any considerable extent, contrary to Charcot's teaching, who holds disease or atrophy of these cells responsible for muscular atrophy occurring in cerebral paresis. Similar cases have

[1] Fracture of the Skull with Localized Paralysis. Lancet, September 29, 1883.

[2] Saville: On a Case of Anæsthesia and Trophic Changes Consequent on a Lesion Limited to the Gyrus Fornicatus and Part of the Marginal Convolution. Brain, Summer and Autumn, 1891.

been observed by Quincke,[1] who established the absence of descending degeneration in the corresponding pyramidal tracts and the integrity of the large ganglionic cells of the anterior in two cases. Our case furnishes an analogy to those of Quincke. One cannot help thinking of a "dynamic" influence of the cortical cells, however distasteful such a qualification may appear to the naturalist and anatomist.

Comparative frequency of infantile and adult cerebral amyotrophy. It is a notable fact that cerebral amyotrophies in children are very frequent, as compared with the number met with in adults. Steiner[2] suggests that in children there is a certain dependence of the ganglion cells of the anterior horns on the ganglion cells of the brain; hence, cerebral atrophies are not rare. In adults the spinal ganglion cells are more independent, hence the rarity of muscular atrophies in the cerebral palsies of adults. If they do occur, they find their analogy, according to Steiner, in the infantile type. This, of course, is not an explanation, but a suggestion; besides, the correctness of the statement may be questioned. For, functionally, at any rate, the spinal cord is the more independent of the brain the younger the animal, and *vice versa*. For what is true phylogenetically, that the lower the order of the vertebrates the closer the approach to the spinal-cord animal, down to the lancet fish, which has almost no brain, is also true ontogenetically. The closer the approach to adult life of a vertebrate, the greater the subordination of the cord to the brain.

Post operative sensory disturbances. In this case, as in several others of the same type I had an opportunity of observing, impairment of sensation set in immediately after the operation, whilst no disturbance of this kind could be made out before. Here was a tumor of considerable size pressing on the whole of the middle third of the Rolandic area, producing complete paralysis of the corresponding arm and shoulder, and yet there was not the slightest trace of deficient sensation. But immediately following the operation there was marked anæsthesia. Such observations are in the highest degree perplexing, proving and disproving in the same individual the sensory qualities of the Rolandic region.[3]

Electrical reaction of the nerves and muscles. It is a well-known fact that in cerebral paralysis electric irritability of the affected muscles is not essentially altered from the normal types; that, if any change exists at all, it occurs in cases of very long standing, and consists in a simple lowering of muscular or neuro-muscular irritability corresponding to

[1] Ueber Muskelatrophie nei Gehirnerkrankungen. Deutsches Arch. f. klin. Med., 1888, Bd. xlii., quoted by Eisenlohr. Muskelatrophie und electrische Erregbarkeitsveränderungen bei Hirnherden. Neurol. Centralbl., 1890, p. 1.

[2] Loc. cit.

[3] Cf. Bremer and Carson: A Case of Brain Tumor, etc. THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES, September, 1890, vol. c. p. 240.

the intensity of the atrophy. In this case, electric exploration of the nerves and muscles of the affected side yielded in brief the following results: There was a slight lowering of the electric irritability, both faradic and galvanic. Galvanic reaction of the right ulnar nerve was changed, A C C > C C C. Of course, this is simply a reversion of the type, and degenerative reaction could not be diagnosticated on this finding, the characteristic sign of this being the slow, lazy contraction. This I could not establish in any of the muscles.

Only in a few cases of cerebral muscular atrophy have the muscles and nerves been electrically tested. So far such tests are chiefly of theoretic value. They are the more so ever since the electro-diagnostic differentiation between central and peripheral paralysis has been demonstrated to stand on a weak foundation. The establishment of degenerative reaction, even in hysterical muscular atrophy has almost dealt the death-blow to the formerly highly-prized diagnostic value of the reaction of degeneration.

Causation. Whether there was any causal relation between the fall on the head and the development of the tumor later on, can be only a matter of surmise. But the often-repeated observation, that brain tumors, principally gliomatous, but not infrequently also sarcomatous, have followed direct and indirect injuries of the head, point to the accident as a probable causative element.

Remarks. The development and progress of the endotheliomatous process in the brain after the operation must have been a very rapid one. As remarked before, the brain-substance pressed upon by the tumor seemed intact at the time of the operation. Manipulation incident to the removal gave, no doubt, the impetus to the more rapid spreading of the morbid growth in the meninges and to the invasion of the brain-substance proper, which before the operation must have been free from tumor invasion. That in this case a good chance of complete success was missed, there can be no manner of doubt. If, instead of frittering away valuable time with the superfluous galvanic and worse than useless faradic current, and the bromide treatment—if, instead of all this, the localizing value of the paresis of the shoulder had been properly appreciated, the tumor might have been removed at a time when its dimensions admitted of a liberal excision of healthy dura mater around it, and when the compression of the brain-substance was not too far advanced to preclude the possibility of a *restitutio ad integrum*. As it was, the filling of the cavity left by the removal of the tumor was probably, in spite of the tampon, so rapid that numerous capillary hemorrhages must have taken place in and around the compressed area of the brain. The softening of nerve tissue was in part due to these hemorrhages.

The scientific importance of our case is somewhat impaired by the

patient surviving the operation for over two weeks. During that time inflammatory changes and invasion of the malignant growth into the brain very much obscured and complicated the anatomo-pathologic conditions giving rise to the symptoms during life. It would, above all, have been of importance to ascertain to what degree and in what manner the cortex was changed. The topography of these changes might possibly have thrown more light on the question of a trophic cerebral centre.

INFECTIOUS ENDOCARDITIS, WITH SEPTICÆMIA, COMPLICATED WITH MULTIPLE NEURITIS.

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THE recognition of various septic or infective agents as causes of multiple neuritis is, of course, not entirely new. The mind recurs at once to such familiar instances as diphtheritic paralysis and to the less frequent but well-known examples of neuritis which occur after typhoid fever, smallpox, and other infectious diseases. More recently still the rather rare peripheral palsies seen after childbirth have been, perhaps justly, attributed to sepsis rather than to pressure. But this term "sepsis" has still a very wide and indefinite application, and seems to be used to include a large number of disease-processes—probably dependent upon a variety of pathogenic organisms—which have not as yet been differentiated and labelled. The infection following childbirth is probably not always the same in all cases, nor, again, is it probably always the same as that following upon a poisoned wound or a suppurating ear. Whatever their source or their exact nature, it has long been recognized that some peculiarly active and malignant disease-agents fasten upon the endocardium and upon the lining membrane of the aorta, whence, as from a centre, they proceed to sow broadcast their baleful effects.

It is not, indeed, necessary to assume that these disease-agents are always the same. We know, on the contrary, that specific and distinct infective agents attack the endocardium with varying degrees of activity, as, for instance, those of rheumatism, of chorea, and of scarlet fever. But these diseases have other and distinctive clinical features which

serve to mark them. There are, however, some, perhaps not a few, active and as yet unnamed, but very malignant forms of infection, making their habitat especially in the heart and great bloodvessels, which, because of their wide systemic effects, and because of their occasional disastrous consequences upon the nervous system, merit our special attention here. The commonly-described and rapidly-fatal ulcerative endocarditis is not the only form whose infection is to be feared, because there may be a non-ulcerative vegetative form, somewhat slower in its action, but none the less eventually fatal. This is marked by immense masses of vegetations, by heart symptoms sometimes obscure but sometimes conspicuous, by a true hectic or typhoid type of fever, by sweating and emaciation, and by various involvements of the nervous system, among the least common but most interesting of which may be neuritis. Multiple abscesses of the brain may also be observed. As an example of each of these we have a case to report here and specimens to present.

E. O., a middle-aged male; had been a steady drinker for years. He denied syphilis. He had been much exposed to hard out-door work, and during the past severe winter had earned a living by shovelling snow. In January, while thus employed, he was taken rather suddenly ill. He had fever and severe pains in his neck, back, shoulders, and limbs. He did not keep constantly in bed at first, but he continued to grow feebler, until one night he fell because of his weakness, and thereafter was obliged to remain in bed. He continued with fever and rapid emaciation for almost three months, losing over forty pounds during this period before his admission to the hospital. From the statements of the patient and his friends, and from his appearance when admitted, it seems probable that during this period of three months he had had a persistent hectic fever, with progressive emaciation and paralysis.

On admission to the hospital, early in April, the patient presented a rather anomalous appearance. He had two sets of symptoms which were prominent and clearly demarcated from each other. The first of these was a low typhoid type of fever, with rapid pulse and malnutrition; the second was an irregularly-distributed multiple neuritis. He was a dark-complexioned, much emaciated man, with a skin of peculiar swarthy or dirty yellowish-brown hue. The face had an expression of hebetude. The tongue was dry and coated, and had a bright red tip. The man's appearance suggested long neglect.

The typhoid type of symptoms was marked by a continued febrile course of temperature. On his admission the temperature was $101\frac{2}{5}°$, and during his entire sojourn in the hospital, *i. e.*, for five weeks, the bodily heat was above normal. If to this period are added the three months before admission, during which he had evidently had the same wasting fever, we have a febrile course of more than four months. At first rather hectic, it became much less remittent toward the end. The pulse was weak and rapid, as high sometimes as 120, but occasionally falling to almost normal. This pulse and the heart-symptoms at once attracted attention, and eventually led to the correct diagnosis. The heart, for instance, had a booming first sound, with marked accentuation of the

second pulmonic sound. A loud aortic diastolic murmur was heard, best in the third interspace at the *left* of the sternum. The apex beat was diffuse, heaving, and displaced downward to the left. The pulse was of the so-called "water-hammer" or "Corrigan" type; and this persisted almost until the end. It was unique. The artery bounded against the finger with much force; the blood, as it were, pausing for an instant as if in an eddy, then suddenly sinking away from under the touch. The accompanying sphygmogram shows this quickness of the pulse, the tracing of the downstroke coinciding almost with that of the upstroke. The loop is caused by the violent oscillations of the artery. The secondary waves are well marked (Fig. 1). Tracings could also be made from the ulnar artery, the pulsation of which was almost as strong as that of the radial artery.

FIG. 1.

The patient, as said before, resembled superficially one suffering from typhoid fever. He had the mental dulness, the wandering delirium, the dry-coated tongue, the rapid pulse, the continued fever, and the general asthenia and wasting. On the other hand, he had a good appetite, no bronchitis, no eruption, no typhoid stools, and the belly was scaphoid. Nor did the range of temperature, although constantly high, correspond strictly to that of the temperature of typhoid fever; there was not the regularity of evening rise and morning decline. Hence, the diagnosis of enteric fever was rejected.

But, as already said, the patient had a second group of symptoms quite as striking as those that characterized his typhoid state. He had very plainly the symptoms of a multiple neuritis. This was irregularly distributed.

The motor phenomena consisted in complete paralysis of the left arm, partial paralysis of the right arm, and double wrist-drop, more pronounced on the left side. The right hand had a tendency to assume the position of *main-en-griffe*. The legs could be moved, but power and nutrition in them were impaired. The knee-jerks were absent. There was no foot-drop. To the faradic current there was diminution in response in the left arm; no response at all in the extensors of the forearm, except in the extensor carpi ulnaris. The muscles of the right arm responded more actively than did those of the left. In the legs the response to faradism was sluggish; in the thighs it was good.

(The galvanic tests were not made, because of some defect in the battery. Later, when the battery had been repaired, the patient was so weak that it was thought best not to transport him to the battery-room, especially as the faradic tests had been quite conclusive.)

The feet and legs were slightly œdematous; the left hand and forearm, also, were somewhat swollen.

Marked wasting of the muscles of the shoulder girdle and of the arms, forearms, and hands was present. This was more noticeable on

the left side. There was not marked wasting of the muscles of the legs. No fibrillary twitching, nor any spastic or increased myotonic state of any of the muscles was observed.

Sensory symptoms were not conspicuous. There was no distinct anæsthesia, but merely some retardation of sensation. No thermo-anæsthesia.

After admission the condition of the patient presented no striking change, only a progressive decline. He continued to grow more paralyzed, and the muscles of the arms and hands wasted more and more. Withal he had no pain, but he had a peculiar rigidity of the neck, which made turning somewhat painful to him.

The diagnosis of the disease was not easy at first, because the grouping of the two sets of symptoms made the man's condition enigmatical. Typhoid fever, which the malady resembled most at first glance, was excluded, as already said, by the range of temperature, the absence of the rose-colored spots, the scaphoid belly, and the absence of the characteristic stools. That there was some septic or infectious process seemed certain, because of the persistent hectic temperature, the sweating, the delirium, the involvement of the heart and pulse, and the albuminous urine. That the man had multiple neuritis was evident, and he had the history of exposure and alcoholism to explain it, in part at least; but the diagnosis of multiple neuritis of alcoholic origin could not be made conveniently to include his typhoid conditon, which had existed now for many weeks. In our experience simple alcoholic multiple neuritis is not accompanied with a hectic state of many weeks' duration. The suggestion of a septic or ulcerative, endocarditis occurred to our minds as the most plausible explanation of the symptoms; and this diagnosis was established eventually by the discovery of a persistent and gradually increasing regurgitant aortic murmur, with its accompanying "water-hammer" pulse. I say "established," because while this diagnosis is regarded usually as problematical to a certain extent, it was not so in our case. The lesion seemed to assert itself so very conspicuously under our observation as the case progressed that, with its attendant hectic phenomena, it left no reasonable doubt of its accuracy. The association of a multiple neuritis with this systemic infection was the phenomenon which to our eyes gave the case a unique and paramount importance, and to which reference will be made again. In the expectation of possible embolic processes in the spleen and kidneys, the splenic region was examined repeatedly for tenderness and the urine for blood corpuscles. Neither were observed, although the autopsy, as will be seen later, showed infarcts in the spleen and in one kidney.

About three weeks after admission our diagnosis of a septic endocarditis was much strengthened by the appearance of small purpuric spots scattered over the body. This eruption was characteristic of a process of blood-poisoning. The patient continued to have a rather high rise of temperature at irregular intervals, and had frequent profuse, drenching sweats. A few days later a bedsore developed over the sacrum. Sudamina also appeared.

The patient's strength gradually failed. Stupor, carphologia, feeble pulse, and high temperature marked the closing days. He died five weeks after admission to the hospital.

Notes of autopsy. Body of a much emaciated, middle-aged man. The muscles of the chest and arms are wasted. In each hand the atrophy

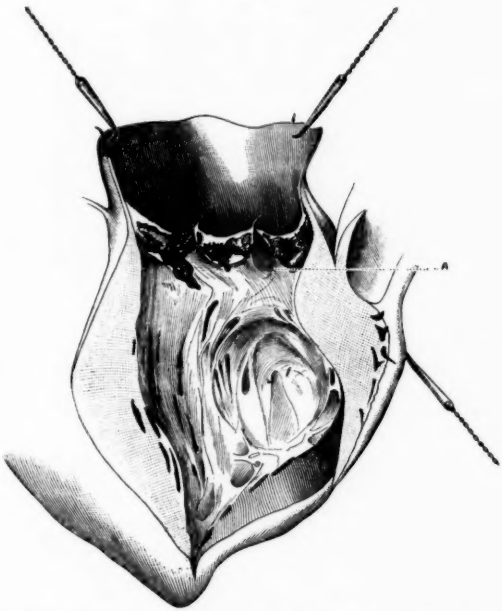
of the abductor indicis is very marked. The fingers are flexed at the first interphalangeal joint. The scapular muscles, especially the supraspinatus and lower portion of the trapezius, are much wasted. The buttocks and hips are the seats of extensive decubitus.

Abdominal cavity. With exceptions to be noted, the contents are normal. No lesions of typhoid fever in the intestines.

Thoracic cavity. The pleuræ are bound together on each side by adhesions of moderate firmness. The lungs are rather œdematous, but otherwise normal. The pericardium contains an excess of fluid, there being about two and a half ounces of yellow, translucent serum. The parietal pericardium shows a milk spot.

Heart. Enlarged; left ventricle firm. Right ventricle contains a small quantity of fluid blood and a chicken-fat clot which has long ramifications through the auricle into the veins. The tricuspid orifice is large and easily admits four fingers and the thumb. Mitral orifice is normal

FIG. 2.



Interior of the heart, showing vegetations on the aortic semilunar valves.
A. Aneurismal cavity.

in size, admitting two fingers. Left chambers almost empty. Left ventricle contracted. A small chicken-fat clot is in the left auricle and aorta; also in the pulmonary artery. The right ventricle seems to be dilated; the wall 6 mm. thick; the wall consists almost entirely of columnæ carneæ. The tricuspid valve is thickened along its edges. The pulmonary valves are normal, except for some thickening along the free

margins of one of the leaflets. Mitral valve is thickened, with a tendency to atheromatous change in the anterior leaflet. The chordæ tendineæ of the anterior leaflet are unusually thick. The heart-muscle is lighter in color than normal and diminished in firmness, evidently on account of degeneration. The papillary muscles especially are light in color.

The *aortic valves* present an astonishing condition. Springing from the inner surface of each leaflet there are huge, cauliflower-like vegetations, which are soft, compressible, slightly injected, the protuberances here and there spanned by threads of lymph. (Fig. 2.) The excrescences are longest and thickest on the anterior and middle leaflets. The posterior leaflet is covered by a large number of vegetations, but of small dimensions. The growths spring from the valve a little below the free margin. On the anterior leaflet the base of the growth extends clear across the valve; on the middle leaflet, two-thirds of the way across. On the posterior the base of the vegetation covers a little more than half of the leaflet. The length of the anterior growth is 2 cm., of the middle also 2 cm. The thickness is 6 mm. in the first and 3 mm. in the middle growth. Vegetations also spring from the angular space between the valves. At the junction of the anterior and posterior leaflets there is a deep cavity, which is surrounded by vegetations, has a roughened interior, and looks almost like a small aneurism. (Fig. 2, A.) The outer surfaces of the valves (facing the aorta) are ridged, and in the position of the vegetations show a funnel-shaped depression running into the vegetations. The intima of the aorta is intensely atheromatous, showing sclerotic and calcareous patches. Weight of heart 14 ounces.

The *spleen* is slightly enlarged. Patches of old perisplenitis are seen, and in the upper part there is a characteristic anæmic infarct. It is a large, white, wedge-shaped mass, extending from the cortex inward a distance of 2½ cm., and measuring 4½ cm. in width at its base. Weight of spleen 6½ ounces.

Suprarenals normal.

Kidneys. In the left kidney the renal arteries stand out prominently; the kidney is firm and normal in size; the capsule strips quite readily, leaving a smooth surface. Weight 5 ounces. In the right kidney the ureter is somewhat dilated; the kidney is normal in size; on its anterior surface are one large and one small yellow patch, which, on section, are seen to be the bases of wedge-shaped masses. In appearance these are white infarcts, like that in the spleen. The capsule strips readily. Weight 4½ ounces.

The *liver* weighs 57 ounces. On section it shows prominence of the interacinous connective tissue. The other abdominal organs are normal.

The *aorta* is very atheromatous, especially in the arch and thoracic portion, where there are numerous large calcareous plates.

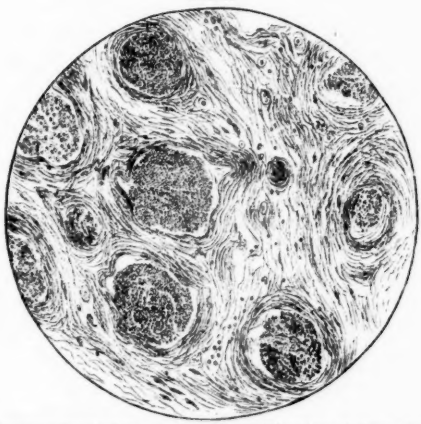
Brain. The membranes are somewhat œdematous, the pia strips readily. The vessels of the circle of Willis are distinctly thickened; from the right middle cerebral artery, within the fissure of Sylvius, springs a small yellowish body a little larger than a grapeseed, quite firm; it is not a dilatation of the artery; it rests in the brain-substance like a foreign body; no area of inflammation or softening surrounds it; it may be a small infarct similar to that in the spleen. On removing the dura from the cord, thin whitish, scaly patches are seen on the pia about the middle of the cord; these scales are not calcareous, but of

cartilaginous firmness. Weight of brain 45½ ounces. In the *cord* itself nothing pathological is discoverable with the naked eye.

Description of Sections.

Musculo-spiral nerve. Right. This nerve shows marked increase of the connective tissue between the fasciculi. (Fig. 3.) This increase is quite

FIG. 3.



Section of the musculo-spiral nerve, showing proliferation of the connective tissue.

apparent even to the naked eye on holding the section up to the light. Hence this is not a pure parenchymatous neuritis. The individual fasciculi also show in some instances decrease in the number of nerve-fibres and increase in the connective tissue. Some fasciculi exhibit bundles of long, opaque fibres in places where the fasciculus has been cut in an oblique direction. In one place a much thickened bloodvessel is seen, and in several places obstructed vessels.

Left. About same appearances as in right.

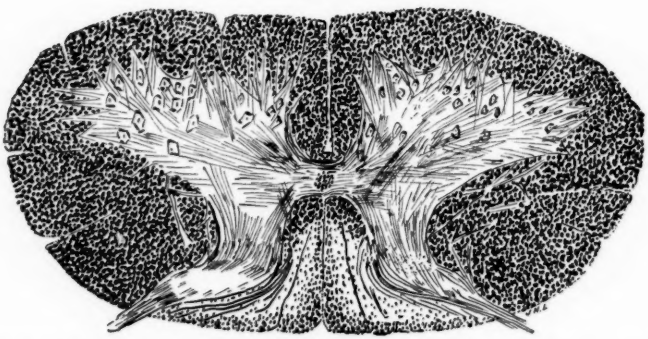
Ulnar nerve. Right. A much thickened and obstructed bloodvessel is seen in one place near the periphery. There is also general increase of the connective tissue, but the individual fasciculi are in better state than in the musculo-spiral nerve. About some of the obstructed blood-vessels, and also about one of the fasciculi—here nearly empty—there is an accumulation of leucocytes. In some places in these sections proliferated connective tissue in concentric layers around bloodvessels is seen (as shown in Rosenheim's illustration as found in Dana's *Text-book*, p. 69). These are probably identical with the "islets of sclerosis" found by Gombault in his case of Landry's paralysis.

NOTE.—In all these sections the nerve fibres have stained heavily—Weigert's stain—and it is not easy to state exactly whether individual fibres are degenerated or not. The general appearance, however, of all these sections leads to the opinion that we have here a connective-tissue

proliferation—*i. e.*, a true inflammation, which includes in some instances the fasciculi, but that the effects upon the fibres are chiefly secondary or degenerative. It is in accord with the ideas of modern pathology to expect to find the results of inflammatory processes in connective tissue and about bloodvessels, as we do in this case. The occurrence of a primary parenchymatous neuritis, as advocated by some, especially Gowers, if by this is meant a precedent and independent involvement of the axis-cylinder, is not so in accord with modern ideas; and this involvement must be an exceedingly difficult thing to demonstrate, even by the most expert pathologist. Certainly most of the illustrations given in the books do not convey such an idea.

Spinal cord. The interesting fact is noted that in the cord, otherwise healthy, there is some evidence of degeneration in the posterior columns. In the cervical region this is marked in both the columns of Goll and Burdach (Fig. 4). In the lumbar enlargement, however, the regions of

FIG. 4.



Cervical enlargement of the spinal cord from a case of infectious endocarditis with multiple neuritis, showing degeneration at this level of both postero-median and postero-external columns, with preservation of small strip along postero-median septum.

the root-zones are most involved. This association of posterior sclerosis with multiple neuritis has been noted by others. The anterior horns in all the sections examined have a full supply of multipolar cells, and the lateral pyramidal tracts are in nowise affected.

It is well to remember, in examining these sections, that they have been made from the nerve-trunks at some distance from the periphery. As is well known, the most marked changes are usually in or near the peripheral nerve-endings. Hence, in this case the sections are from a portion of the nerves probably some distance above the areas of greatest change.

The association of a septic process and multiple neuritis was the phe-

nomenon which gave our case an especial interest. The explanation of this association is, of course, the one point of scientific importance. Was the association a mere coincidence, or was the septic process the cause of the neuritis?

Several points must be considered in this connection. First, the septic process was probably antecedent to the neuritis, as shown by the history. The exhausting, wasting hectic fever had existed for many weeks before the patient's admission to the hospital. It was the most conspicuous of the two sets of symptoms, and the one that caused the fatal end. The patient died of sepsis, not of neuritis. The origin of this sepsis is, it is true, problematical. It was not in any way consequent upon a nerve-lesion, as is sometimes seen in cord-cases, in which a septic infection occurs from a bedsore. This patient had no bedsore nor any break in his skin when admitted to the hospital, far advanced in his disease, and no bedsore developed until toward the end. Again, it may be observed that this septic process did not depend upon a pus-forming bacillus. The vegetations within the heart and the infarcts in the spleen and the kidney were not attended with the formation of pus. An exception was possibly observed at the base of one of these masses, where what seemed to be a small ulcerated cavity was found. There were no multiple abscesses as in cases of pyæmia. In this respect this systemic poison resembles some of the other great nerve poisons, as, for instance, those of tetanus, hydrophobia, chorea, and diphtheria, in none of which is there a formation of pus. The origin of the infection in the heart in our case is obscure.

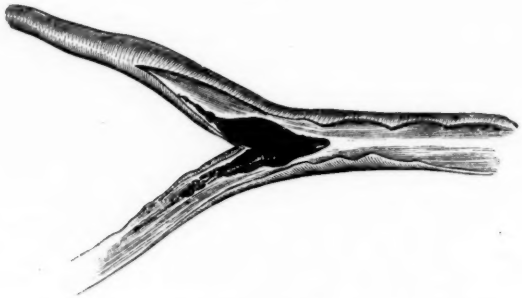
Finally, the neuritis was not so extensive and severe as occurs in some cases that recover. It was only irregularly distributed, and not, as in most fatal cases of neuritis due to alcohol, symmetrically and extensively spread. In fact, it does not seem probable that the neuritis, severe as it was, would have killed the patient without the septic process. On the other hand, there is evidence, no doubt, in favor of an alcoholic origin of the neuritis. The patient had been a steady drinker for years, and this excess was associated with hard labor and exposure—an association which, more than any other, precedes the onset of this disease.

A bacteriological examination of these cardiac vegetations would have been a most desirable conclusion to our study of this case, but was not possible at the time.

In conclusion, we would call attention to the extreme importance of these immense giant vegetations in the heart, and occasionally in the aorta, as causes of obscure but grave symptoms, both general and nervous. Only a few days ago, and since this report was made up, a man died in the hospital service of one of us with symptoms simulating closely those of typhoid fever. His case was briefly as follows:

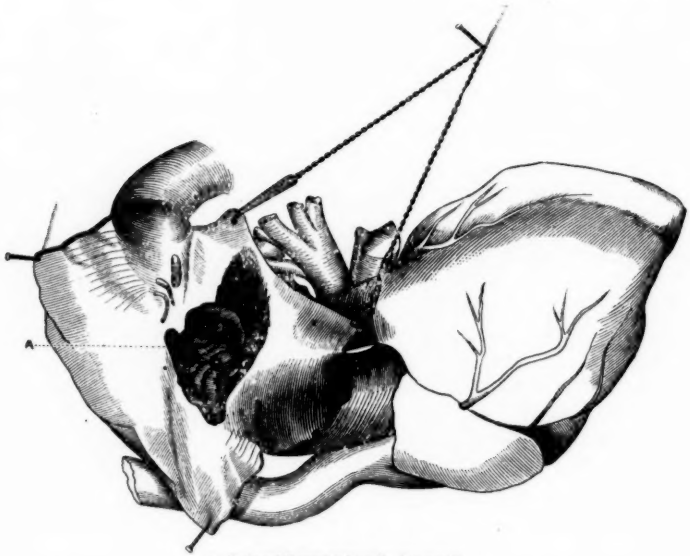
A. B., male, aged about forty-five years, was admitted to the hospital suffering with headache, hebetude, psychic disturbance, such as melancholia, and an almost persistent but variable fever. The headache was frontal, and apparently severe, for the patient, even in his hebetude,

FIG. 5.



Brachial, radial, and ulnar arteries, with embolus at bifurcation

FIG. 6.



A. Polypoid vegetation in the aorta.

complained constantly of it. The melancholia was also a conspicuous symptom; it was associated with delusions of personal unworthiness. When roused and questioned he reverted constantly to the subjects of his melancholic delirium, and sometimes he wept about them. There

had been, also, some diarrhœa and abdominal distention, so that the case simulated rather closely typhoid fever. No rose-colored spots, however, could be found at any time, and the temperature, instead of ranging constantly above normal, dropped occasionally to 98° or below that point, as it is apt to do in septic cases. The diagnosis of the case remained quite obscure. There were no lung-symptoms, and nothing wrong was found in the urine except some albumin. There was a history of exposure to the sun, which suggested at first heat-stroke. Later, tuberculosis was suggested, searched for and excluded. No cardiac symptoms were present, as the mass found post mortem in the aorta did not embarrass the heart's action in the least. Absence of the left radial pulse, however, was noted for more than a week before death, and this was observed to be due to an obstruction which could be traced to the bifurcation of the brachial artery. The brachial artery itself pulsated. Sepsis, due to some pus-forming organism, seemed to be a plausible explanation of all the symptoms, but its mode of entrance into the system and its chief habitat remained a mystery to the end.

Post mortem the patient was shown to have had small multiple abscesses in the brain, a large embolus in the left brachial artery (Fig. 5) which had been recognized in life, and a large recent infarct in one kidney—all caused evidently by an immense vegetating mass which was found on the inner wall of the aorta at its arch. A drawing of this vegetating mass is given here. (Fig. 6.) It may be observed from this drawing that this mass is almost directly in front of the orifices of the great arteries of the head and arms—*i. e.*, the innominate, the carotid, and the subclavian. From it, as from a centre, small emboli had been carried to the brain, where they became each the focus of a small abscess, and to other organs and parts, especially into the brachial artery and to the kidney.

EXTERNAL PILES AND THEIR RELATION TO THE EXTERNAL HEMORRHOIDAL VEINS.

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The swellings and vascular tumors occurring at the lower extremity of the alimentary canal, known as hemorrhoids or piles, are very naturally classified, according to their position, as either external or internal. This classification is based not only on the fact that one group is in view and covered with skin, while the other is concealed within the bowel and covered with mucous membrane, but also on account of their relations to the external and internal hemorrhoidal veins respectively.

As the essential element in a large majority of hemorrhoidal swellings is a varicose condition of the hemorrhoidal veins, the study of this disease cannot lead to any satisfactory results unless based upon a comprehensive and accurate knowledge of the arrangement of these veins. The hemorrhoidal veins comprise the internal or superior hemorrhoidal,

the middle hemorrhoidal, and the external hemorrhoidal, all of which accompany the arteries bearing the same names.

The *internal* or *superior hemorrhoidal veins*, an important factor when in a diseased condition in the production of internal piles, form a complex interlacement in the submucosa of the lower rectum, known as the hemorrhoidal plexus. These veins are valveless and collect the venous blood from the mucous membrane of the rectum, conducting it through openings in the *muscularis* into the inferior mesenteric vein, thus forming the most dependent portion of the portal system.

The point in the anal canal that marks the transition from skin to mucous membrane also marks the lowest and most distant region in the body tributary to the *vena portæ*. This transition takes place quite abruptly, a little above the lower border of the internal sphincter. In the living body its approximate location its determined by the presence of a more or less distinct sulcus or groove completely encircling the anal outlet in a somewhat zigzag course (see Plate, Fig. 1, *g*). This groove also marks a point from which the venous blood flows in two different directions; a watershed, so to speak, of the portal veins on the one side, the iliac veins on the other, but a watershed of such low altitude that under certain conditions it does not interpose a sufficient barrier to prevent an intermingling of the two streams. At this point, as will be seen by the accompanying drawing made from one of my dissections, the external and internal hemorrhoidal veins are continuous one with the other, the communication being established by numerous short and narrow anastomoses in the submuco-cutaneous tissue underlying this groove a little above the lower border of the internal sphincter.

DESCRIPTION OF PLATE.

FIG. 1.—An alcoholic preparation of the lower rectum opened lengthwise in the median line anteriorly, a portion of the mucous membrane and muco-cutaneous tissue having been removed to expose the internal and external hemorrhoidal veins.

X, X'. The lowermost *plica transversalis recti*, one of a series of ineffaceable transverse folds that are present in the rectum, with considerable variation as to their number and distinctness in different individuals. These folds are arranged, one beyond the other alternately on the left and right sides of the rectum, and are analogous to the transverse folds that characterize the colon, showing, as I have elsewhere demonstrated (Leipsic, 1887), that the rectum, like the colon, is sacculated. *a*. The short and narrow anastomoses between the dilated portion of the internal hemorrhoidal veins above and the dilated portion of the external hemorrhoidal veins below. *e*. Dilated external hemorrhoidal veins. *g*. The sulcus or groove that encircles the anal orifice. Just above are to be seen the *columnæ* and *lacunæ* of Morgagni. *i s*. Internal sphincter. *e s*. External sphincter.

FIG. 2.—A semi-diagrammatic drawing of a longitudinal section through the side of the lower end of the rectum.

1. Skin. 2. External sphincter. 3. Levator ani. 4. Longitudinal muscular fibres. 5. Circular muscular fibres terminating in the internal sphincter. 6. Internal hemorrhoidal veins in the submucosa. 7. Mucous membrane. 8. One or more papillæ are often seen on the bases of the columns; this is due to the fact that the papillary layer of the external skin extends for a short distance above the groove onto the columns, while in the lacunæ between the columns the follicles of the mucous membrane are present as low down as the groove. 9. The *ano-rectal* groove which is produced by the distention of the internal veins just above it and the external veins just below it. In the dead body, where the veins are empty, the groove will not be apparent. 10. Dilated portion of an external hemorrhoidal vein.

FIG. 1.

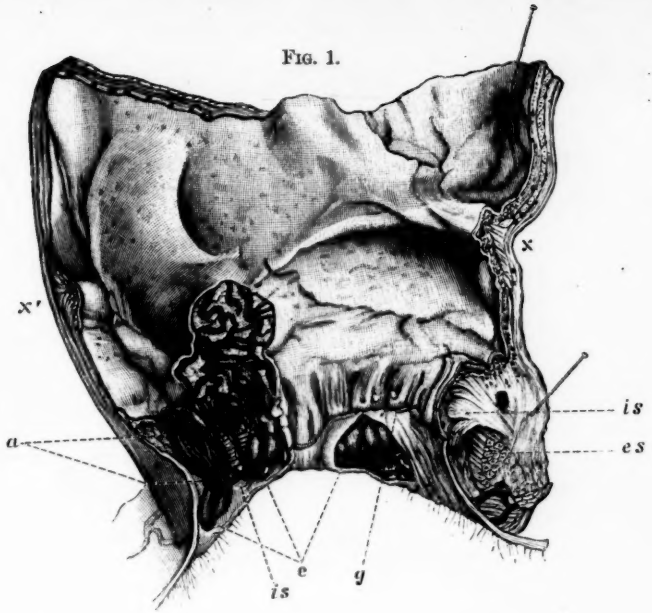
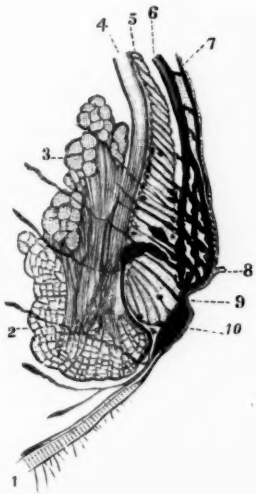


FIG. 2.



From these short and narrow anastomosing branches the external and internal hemorrhoidal veins may be said to begin; the internal veins ascending in the submucosa of the rectum, the external veins descending and radiating away from the rectum, under the skin. The internal veins, as they ascend from this point of origin, immediately break up into a meshwork[1] of short and irregularly-dilated branches for the most part fusiform and bulbous[2] in shape, completely encircling the canal and confined to that portion of the submucosa included within the grasp of the internal sphincter. On examining this part of the venous apparatus more closely, these dilatations or ampulla-like sacculations are seen to be arranged in clusters[3] in a circular manner, situated in the bases of the longitudinal folds of the mucous membrane of the rectum, known as the *columnæ recti.* These clusters of sacculations spread out laterally as well as centrally, and communicate one with the other, while the axes of their component parts are vertical. They do not hang from their efferent veins like grapes from their stems, for they are possessed of afferent veins as well, and appear to be nothing more or less than varicosities that have undergone a certain amount of proliferation. As the upper border of the internal sphincter is approached they converge and reunite, forming large trunks which pass up the bowel alongside of the terminal branches of the superior hemorrhoidal arteries. In the meantime, numerous fine branches have been given off from the sacculations to traverse the fibres of the sphincters[4] and to find their way, by a more circuitous route, into the iliac veins.

The *external hemorrhoidal veins* do not present such a complicated arrangement of sacculations as is seen in the internal veins just described; but they, in turn, as they emerge from the lower border of the internal sphincter, are very much dilated, so that the lower border of the internal sphincter and the internal border of the external sphincter are completely hidden by the pouch-like dilatations of these veins. From here the veins abruptly narrow down, and form an interlacing network of fine subcutaneous branches, inosculating to form larger branches, finally emptying into the internal pudic veins. Thus it will be seen that it is possible to inject from the inferior mesenteric vein all the hemorrhoidal veins,[5] both within and without the lower rectum, with the exception of the middle hemorrhoidal veins, an exception accounted for by the fact that these veins are by no means constant,[6] and that when they are present[7] they do not start from the mucous membrane of the rectum and consequently are not a factor in the production of hemorrhoids.

Looking at these veins collectively, two points are to be noted: First. The lower end of the rectum is surrounded by two rings, or zones, of dilated plexiform veins, forming an internal and an external hemorrhoidal plexus, the one situated just within the bowel, and corresponding in area with the internal surface of the internal sphincter, the seat of

internal hemorrhoids; the other zone situated just without the bowel, and corresponding in area with the internal border of the external sphincter, the seat of external hemorrhoids. Secondly, that the two plexuses communicate, the anastomosis taking place in the submucosa underlying an *ano-rectal groove*. Whether this arrangement of the rectal veins exists in the early stage of life I cannot say; but that it occurs normally in the adult seems to me very probable, intensified and aggravated, no doubt, by the erect position of the body, the dependent position of the veins, and the act of defecation.

I have selected as the topic for this paper external piles, particularly on account of the intimate relations borne by some of these swellings to the external hemorrhoidal veins; some, on the other hand, having no connection whatsoever; hence, the reason I use the general term piles in preference to hemorrhoids, as, bleeding not being a symptom of external piles, external cutaneous piles certainly cannot, strictly speaking, be called hemorrhoids. With a view to ascertain the relative frequency of internal and external piles, I have gone over the cases of rectal disease that have applied to me for treatment during the past few years at the Boston Dispensary. Out of the total number of 1472 cases, 895 have come under my personal observation. Of these 895 cases 338 were cases of piles, 171 internal, 167 external piles. These data are not sufficiently exhaustive to warrant the inference that internal piles are of more frequent occurrence than external, though I believe this to be the case, for it must be remembered that external piles in the acute stage are very distressing, with no cessation during the attack, compelling the sufferer to seek medical aid; while, on the other hand, many persons who are subject "off and on" to internal piles are only conscious of the disease during a period of constipation, and then only at the time of defecation, with comparative comfort during the intervals. Such cases are not compelled, as in the first instance, to seek medical advice, and either do nothing or rely upon favorite remedies recommended by friends or the nearest druggist.

As the tissue involved in the production of external piles is either vein or skin, they can be divided into two principal varieties, venous and cutaneous.

The venous variety of external pile occurs in two forms:

1. As a varicose condition of the external hemorrhoidal plexus.
2. As a thrombosis of the external hemorrhoidal plexus.

1. A *varicose condition* of the external hemorrhoidal plexus,[8] I have already pointed out, is probably the normal arrangement in every adult. A familiar instance of this is seen in every operating-room with a patient in the lithotomy position when pressure is brought to bear on the abdominal contents, as by the straining of vomiting. It is also made evident by the act of defecation when the internal sphincter

dilates to let the contents of the rectum pass out. The extent to which this venous dilatation is carried will vary with the habits of the individual as regards constipation and the amount of straining and bearing-down at stool. This form of the disease is most marked in those persons who are subject to internal piles; in fact, in these cases it is a symptom of internal piles. Inasmuch as the blood by which this plexus of veins is dilated comes from within the bowel, that is, a backward flow from the portal veins, the condition of the internal sphincter is also going to affect the amount of varicosity present in these veins: the stronger and tighter the muscle contracts the less the amount of regurgitation; the weaker and looser the contraction the greater the amount of blood that will be forced by.

To make my meaning clearer I must refer briefly to the anatomy of the internal sphincter (see Plate, Fig. 2). This muscle is a thickening of the lowermost fibres of the circular muscular coat of the rectum, encircling like a wide and thick band the extreme end of the alimentary canal for a distance of about 1¼ inches. Its fibres being non-striated, it is an involuntary muscle, and, except during the exit of gas and feces, it is always in a state of firm tonic contraction. The puckering of the mucocutaneous integument into folds, which are seen radiating from the anus, is due to the tight contraction of this muscle; hence, it is evident that its lower ring-like border must be subcutaneous, a point in the anatomy of this muscle not generally appreciated. The external sphincter is placed just outside of the internal sphincter, which it surrounds and partially overlaps, its lower border reaching from one-half to three-quarters of an inch below that of the internal sphincter. Consequently the internal sphincter is internal to the external in two senses—in one sense that it is surrounded by it, in the other sense that it is placed a little further within the body. The external sphincter is a voluntary muscle, and when at rest exerts no active influence in closing the anus, that office being performed by the internal sphincter; but when gas or feces are propelled by peristalsis against the upper border of the internal sphincter, then the sensation of an impending evacuation is produced, the internal sphincter dilates and offers no resistance, and a threatened disaster can only be prevented by voluntary contraction of the external sphincter, together with the other perineal muscles. The firm tonic contraction of the internal sphincter above alluded to, a condition which obtains for the entire twenty-four hours, with the trifling exception of the time consumed in passing the contents of the bowel, presents an obstacle to the regurgitation of portal blood essential to dilatation of the external hemorrhoidal plexus. We must assume either the presence of hepatic obstruction or intra-abdominal pressure of whatever kind, or the existence of a constipated habit with prolonged straining at stool, as the force at work to produce a varicose condition of these

veins. Without ignoring the significance of the more remote causes I am inclined to believe that the act of defecation is the most important factor in the production of this condition.[9] As long as the veins remain pervious and free from inflammation there will be no very marked symptoms, and the patient will, in all probability, be unaware of the existence of the disease; but when any portion of these varicose veins becomes the seat of thrombosis and phlebitis, a not infrequent occurrence, then will be produced the second variety of the external venous pile, known as the thrombotic pile.

2. The *thrombotic pile*[10] is of very common occurrence. In fact, it is met with much more frequently than any of the other forms of external pile. Of the 167 cases of external piles mentioned above, 107 were of this nature. It has been my experience to find it much oftener in the male than the female. It is liable to happen to any one, regardless of his condition, circumstances, or habits. Among the class of patients that frequent the Boston Dispensary it is not uncommon to find that the disease appeared during a protracted debauch, and also to find it associated with constipation or a particularly hard and difficult stool; while, on the other hand, it happens as well to the temperate and those with strictly regular habits. The disease makes its appearance quite suddenly, sometimes with a premonition of from a few to twenty-four hours of local soreness and slight swelling before the tumor is fully formed. From the suddenness of its appearance the patient often imagines that it is a prolapsed internal pile, and needless suffering is caused by fruitless attempts to push it back. The site of the pile is identical with that of the varicose pile just described, that is, in any portion of the zone of dilated veins forming the external hemorrhoidal plexus. Such a tumor would be located just below the lower border of the internal sphincter, opposite to and within the grasp of the external sphincter. The size depends entirely upon the size and number of the thrombosed veins, while its shape is flat, with a broad base resembling somewhat in appearance a large bleb of dark color. The color of the pile is quite characteristic, livid, with dark-blue spots here and there, this color not belonging to the tissue, but transmitted through it from the thrombus or thrombi within.

When thrombosis occurs in this locality the process appears to be limited to the dilated portions of these veins without complete stasis affecting a large territory, and the resulting reaction is confined to the walls of the vessels immediately affected whose vessels of supply are obstructed, giving rise to slight inflammatory swelling with moderate redness, considerable pain, and a watery infiltration of the cellular tissue.[11] In some cases of thrombotic pile the amount of œdematous swelling is so marked as to be misleading and obscure the actual condition present, but by keeping up a firm and continuous pressure with the

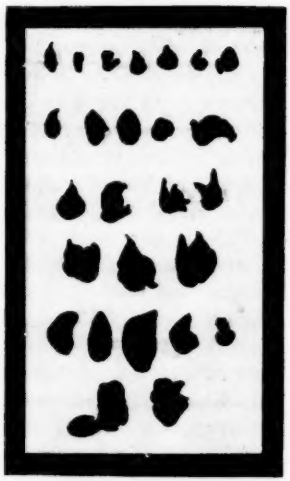
fingers it will be possible to make out the presence of one or more hard and very sensitive nodules indicating the location of the thrombi. If the thrombotic pile is let alone, it will, as a rule, entirely disappear without leaving any external evidence of its existence. However, if from the amount of pain present, and from the inconvenience of the swelling, incision be deemed advisable, immediate relief will be given; but by the addition of the element of trauma a small but permanent cutaneous pile is likely to remain after complete convalescence. In all such cases it is my practice to advise immediate incision to let out the clot and relieve the tension, to accomplish which purpose I use an ordinary but sharp scalpel, first washing the surface of the pile with a 5 per cent. solution of carbolic acid; selecting as the point of incision a dark-blue spot or a point directly over the largest nodule (for it is rare not to find more than one), a quick and deep incision is made directly into the thrombosed vein. Oftentimes the thrombus will shell out like a bean from its pod, but more often the thrombus will only protrude from the opening, being held back either by an adhesion to the wall of the vein or by an extension into a communicating branch, requiring a little force to relieve it. On looking into the wound thus made more thrombosed veins will be seen, which can be opened as well from the cut already made as from a second incision; but a second and even a third incision is sometimes necessary, especially in case the pile occupies the entire side of the anus. After the removal of the thrombi, the swelling being perceptibly reduced in size, the pile is washed with a 1:3000 bichloride solution and the wound dusted with a powder of equal parts of iodoform and boric acid; to prevent bleeding and further swelling firm pressure is applied by means of a graduated compress and maintained with a T-bandage tightly drawn for the next twenty-four hours, or longer if possible. I have seen on a few occasions a thrombotic pile from which there was a constant oozing of blood. This invariably occurred in a pile that had been present for two or more weeks, the bleeding causing the patient to seek medical aid. The appearance presented was that of a moderate-sized pile with a sloughing of the integument directly over the thrombus, and through the breach thus formed was protruding the thrombus partially organized. How the coagulum in these cases got out of the vein I am unable to say, but as there was always more or less suppuration present, it is possible that that process had something to do with it. This is one of the very rare instances in which bleeding occurs as a symptom of external piles.

Examination of the thrombi, after their removal, reveals a decided similarity in shape, the majority conforming to one type, conical, tapering to a fine thread-like point, the color of the thrombus in its thickest portion being a deep blood-red; at the edges and the tapering point it is a translucent pink.

In the light of the anatomical arrangement of the veins where these thrombi are formed, it is impossible to come to any other conclusion than that the coagula are casts of these veins.

With a view to determining whether, as Ball states, these thrombi are formed within and not without the veins, for sometime past I have been in the habit of saving all thrombi and preserving them in alcohol for the purpose of studying and comparing their shapes. The result has fully established the accuracy of the views of this writer.

FIG. 3.



Showing the general shape and form of thrombi that have been removed from thrombotic piles during life.

The accompanying cut represents some of these clots arranged for exhibition on a piece of glass. The general shape to which they all conform is conical, with a rounded base; some are casts of a single dilated vein, while others are evidently casts of two or more communicating branches. Many writers deem this form of venous pile an encysted blood clot occurring outside the vein, brought about by extravasation of blood from a rupture of one of the external hemorrhoidal veins during defecation. That this view of the disease is an erroneous one is proven, I think: (1) by the absence of any staining of the tissues which characterizes extravasation; (2) by the fact that when the pile is incised the thrombosed veins can be seen side by side in the infiltrated cellular tissue, incision into the vein demonstrating the presence of the thrombus; (3) by the fact that the thrombi are casts of the veins in which they are formed.

In the second variety of external pile (*the cutaneous*) the external hemorrhoidal veins do not play so important a rôle as in the venous pile just described. Cutaneous piles are essentially swellings or hypertrophies of the muco-cutaneous integument, and with one exception are brought about by, or are secondary to, some inflammatory process just within or near the anus. As it is possible to recognize three different forms of cutaneous pile, I would suggest for their more ready comprehension the following classification:

1. The redundant pile.
2. The hyperplastic pile.
3. The hypertrophic pile.

1. The *redundant pile* is that condition of the anal muco-cutaneous tissue often met with and variously described as a simple redundancy, or again as a superabundance of skin. It is in reality a compensatory increase in the amount of the circumanal integument, brought about not by any inflammatory process but by stretching—a stretching of the skin resulting from excessive distention of the subjacent veins in those individuals in whom the act of defecation is accompanied with excessive and prolonged expulsive efforts. The stretched skin hangs in loose folds like a fringe, either entirely surrounding the anal outlet or confined to one side, or occurring only at one or more isolated points, and wherever found is a sure indication of the existence of a varix directly underlying it. The redundant pile is soft to the touch, and the two surfaces of the reduplicated skin are freely movable upon each other. In marked contrast to this appearance of the pile is that observed during defecation. Then the slack is all taken up and the skin put upon the stretch by the swelling and distention of the subjacent veins. Like the varicose pile, it is always associated with and secondary to internal piles, and when occurring in its fullest degree may be taken as an indication of the existence of internal piles of long standing with a weakened internal sphincter. This weakness or looseness of the internal sphincter is caused by the stretching it receives from the frequent prolapse of the internal hemorrhoidal tumors. Another phase of the redundant pile is seen whenever internal piles have become prolapsed and strangulated. Then the resulting venous hyperæmia and the obstructed lymph channels give rise to an œdematous swelling of the loose muco-cutaneous tissue just outside of the prolapsed internal pile or piles. If the prolapsed rectal tissue comprise only a portion of the internal pile area, then the external swelling will be confined to the adjacent integument; but if it involve the entire circumference of the internal "pile-bearing area," then it will surround it as a ring, each form of pile having its own peculiar color, the two being separated by a deep sulcus,[12] the same sulcus or groove already described as separating the internal and external hemorrhoidal venous plexuses.

In cases of *prolapsus recti* not associated with internal piles, if the middle or upper portion of the rectum be the part extruded, the condition is that of an invagination, and for obvious reasons the ring-shaped œdematous redundant pile will not be present. The presence or absence of this condition may be therefore of some diagnostic value in determining between prolapsed internal piles and prolapsed rectum.

2. The *hyperplastic pile* is always associated with a breach of the muco-cutaneous surface just at the lower border of the internal sphincter. The chief exciting causes are abrasions, fissures, or ulcerations of whatever nature that have been engrafted upon this locality. The resulting swelling in this instance is analogous to the swelling of loose cellular tissue in other parts of the body following a breach of its cutaneous surface, which subsides and disappears with the healing of the breach. But if the irritation is continued for a sufficient length of time there will result a hyperplasia of the contiguous skin and subcutaneous connective tissue, forming at the anal margin a flattened and pendulous tumor, or, as it is generally called, a cutaneous "tag." A common instance of this form of cutaneous pile is seen in connection with fissures, and as fissures occur most often posteriorly, the existence of an acutely-inflamed cutaneous pile in this region is pathognomonic of an ulceration just above it.[13] Ulceration of the lower rectal mucous membrane with its lowest termination just emerging from the lower border of the internal sphincter is a very frequent cause of the hyperplastic pile. The cutaneous pile associated with stricture of the rectum low down[14] belongs to this class, and when found in this connection I always regard it an evidence of the ulceration having extended as low down as the anal margin. Cutaneous piles, resulting from surgical operations in this region, where there has been some delay in the healing process, also belong to this class. The hyperplastic pile is somewhat hard and firm to the touch, and its two opposing surfaces are not readily movable upon each other, owing to more or less hyperplasia of the subcutaneous connective tissue. As I have already remarked, it is flattened and pendulous, with a more or less elongated and narrow base, which may or may not correspond to the central or anal end of one of the normal radiating folds. During the acute or growing period of its existence this pile is exquisitely sensitive from œdematous swelling, and is a source of great annoyance, while in the chronic state, after the exciting cause has been repaired, the pile assumes a state quite similar to the redundant pile, with no particular symptoms other than the inconvenience arising from its size; but it is to be distinguished from the redundant pile by its harder and firmer feel and by more or less adhesion of its opposing surfaces. In this, as in all cutaneous piles, repeated attacks of œdematous swelling occur, each attack adding materially to the hyperplasia, or the inflammation may terminate in suppuration. Thrombi, it is true, may occasionally be found in the

hyperplastic pile.[15] In this event, however, their presence is accidental and not at all to be considered as a cause of the pile, the altered condition of the tissue through which the vein passes causing retardation and stasis of the blood current, producing what Bilroth calls "thrombus from compression."[16] The cutaneous pile, resulting after incision or suppuration of the thrombotic pile alluded to above, belongs to this class.

3. The *hypertrophic pile* is the condition in which the muco-cutaneous integument is left after recurrent and long-continued attacks of eczematous inflammation from whatever cause, such attacks occurring not infrequently in this locality. The congested, thickened, and infiltrated integument, with exaggeration of the natural folds and furrows aggravated by rubbing and scratching, is left after subsidence of the inflammation more or less hypertrophied. The resulting hypertrophy is most marked in the natural radiating folds, a characteristic point being that the enlargement is present in the entire length of the fold. From the exudation which accompanies this inflammation the hypertrophied folds are kept continually moist, giving them a whitish and macerated appearance, completely obscuring the pigmentation normally present in the part.[17] From the association of this cutaneous pile with an eczematous inflammation it is often assumed that the presence of the pile is the cause of or a source of aggravation to the eczema,[18] and the removal of the hypertrophied folds is recommended as a salutary measure. This view, it seems to me, is fallacious, inasmuch as the cutaneous pile stands in no way as an etiological factor of the eczema, but the eczema is the cause of the pile,[19] and the indiscriminate removal of the *hypertrophic pile* would produce a condition far worse than the disease for which it was supposed to be responsible.

The main object of this contribution is to emphasize the important fact in the etiology and pathology of external piles that certain pre-existing abnormal conditions are indicated whenever such piles are found. It follows as a natural sequence that successful treatment of this affection demands a knowledge of the etiology. The clinical features and treatment will be considered at length in following communications. It may be noticed here, however, that the necessity of so radical a measure as excision will be limited to the *hyperplastic pile*, the mechanical inconvenience of which may demand this operation. For the relief of the *thrombotic pile* incision alone will in most cases suffice.

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TETANY IN AMERICA.[1]

With a Report of Five Cases.

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Although frequent enough in many parts of Europe, tetany is of sufficiently rare occurrence in this country to warrant the report of the following instances, and to render interesting a review of the cases published in America.

Considerable confusion exists regarding the exact application of the term "tetany." Certain writers would confine it to those cases in which there is a very marked intermission in the spasm, reserving the word "arthrogryposis" for those in which the contraction is more continuous. The condition described as "carpo-pedal spasms" is by some writers considered quite distinct from tetany, and by others, as, for instance, Fagge, viewed as a minor form of it. Strümpell denies the existence of tetany in early childhood, and Henoch draws the line sharply between the disease as seen in children and in adults. Others, as Schlesinger, speak of a tetany and a psuedo-tetany, making the distinction largely on etiological grounds. Some would exclude all cases which do not exhibit marked increase of the mechanical and electrical excitability of the

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nerves and muscles, while others, admitting the great frequency of these conditions, do not consider them as essential to diagnosis.

Finally, several distinct varieties of tetany have been described—as, for instance, rheumatic tetany, chronic tetany, tetany following thyroidectomy, and tetany due to dilatation of the stomach.

The more one studies the subject the more impossible does it seem to establish any line of demarcation between the different forms of the disease. There are numberless gradations between the conditions of well-marked, widespread, intermittent contractions, and of the continuous or intermittent carpo-pedal spasms. Then, too, some cases exhibit intermittent contractions at one time and continuous at another, or intermittent in one part of the body and continuous in another part. Not every case shows all the cardinal symptoms, including those described by Trousseau, Chvostek, and Erb. While, therefore, it is very possible that two or more diverse conditions may be included in the term, in the present state of our knowledge it seems best to define tetany as a disease consisting of tonic spasms either continuous or paroxysmal; usually symmetrical; affecting especially the extremities, but often widespread or sometimes confined to one limb; not accompanied by unconsciousness and not depending upon any irritative lesion of the brain, cord, or nerves, or upon hysteria.

Tetany has been so thoroughly described in other countries during recent years that any account of its symptoms would be out of place before this body, and I may now simply present the clinical histories of the cases which I have seen. I regret that the details are in some particulars far from complete.

Case I.—Willie McG., aged nineteen months; fairly well nourished; had several eclampsic convulsions when about two weeks of age; pneumonia at about one year. No note made of the existence of rickets or other form of ill health. About March 17, 1886, he began to vomit and continued this until the 21st. On the 20th he commenced to scream and his eyes turned up and often crossed. The thumbs became flexed into the palms; the fingers firmly bent at the metacarpo-phalangeal articulations, but straight elsewhere and adducted; the wrists flexed; the feet and toes extended. The hands and feet had a somewhat blue and swollen appearance. By the next day all spasm was gone, but by the afternoon of the 23d (two days later) all the symptoms had returned. The abdomen was swollen and tender. During the night following there was some stridulous breathing after cough, and on the 24th the spasm of the extremities was still present, although the eyes were now unaffected. Effort made forcibly to overcome the contraction caused screaming. The bowels were constipated; the tonsils enlarged, and they and the pharynx somewhat red; some mucous râles were audible in the chest. The record made on April 1st, one week later, states that the contractions were still present to some extent. The child let the hands hang most of the time with the wrists flexed, and he could not seize a pencil at all easily. He would crawl on his hands and knees instead of on his

hands and feet, as was his custom when well. On April 14th it was recorded that full power had returned. About April 21st he developed rubella, which was preceded and accompanied by severe diarrhœa. April 22d, he awoke screaming, the contractions having suddenly returned in full force. The screaming lasted only a short time, but efforts forcibly to straighten the limbs brought it on again. In about three hours the spasm passed away. There was no further trouble until June 14th, when vomiting and diarrhœa with cough set in and continued, and on the morning of the 18th crying with flexion of the thumbs and wrists and extreme extension of the toes developed. The child kept putting his hands to his feet as though the latter were the seat of pain. He was better in the afternoon, worse at night, and on the next day much as when first seen, except that the fingers were straight and separated from each other. There was no pain except on passive motion. Nothing further was heard of the patient for some years, when I learned that there had been attacks of tetany on several occasions. About three years ago he died of some obscure meningeal affection in the Children's Hospital of Philadelphia. No autopsy could be obtained.

This case illustrates well the close etiological association of tetany with gastro-intestinal disturbance. Pain, it will be noticed, occurred only when the attacks began or when the parts were handled. The stridulous respiration heard on one occasion indicated a tendency to laryngismus, the close connection of which with tetany is so well understood. The separation of the fingers seen in the attack in June is worthy of remark, as it differed from the accoucheur's position more commonly witnessed. For the most part the contractions in this case lasted several days or a week or more, and should therefore be called continuous. On other occasions they were of short duration, lasting but a few hours or a day, and cannot be placed in this category.

Case II.—Charles S., light mulatto, aged two years, was brought to the out-patient department of the Children's Hospital, May 1, 1889. The mother stated that for five months he had had difficulty in swallowing, solid food being taken more easily than liquid. The latter made him choke so that he grew "black in the face" and had to be beaten on the back to make him breathe again. He had also at times difficulty in breathing, the inspiration having a distinctly crowing character. The mother further stated that he sometimes had "spasms" in which the fingers were drawn inward and the wrists flexed, and that this condition would last for "some time." Examination of the child showed him to be a well-marked case of rickets. While in the clinic room his respiration was distinctly noisy, but the clinical notes indicate that it was rather the expiration than the inspiration. This may have been an error. He was ordered cod-liver oil and rock-salt baths, but he did not return. Several futile attempts were later made to see him in order to study his symptoms more fully. About a year later I learned that he had continued to have the attacks of tetany at intervals.

The brief and incomplete notes of this case serve at least to illustrate the close connection between rickets, laryngismus stridulus, and tetany.

The nature of the difficulty in swallowing is not clear. Very probably there was a spasm of the muscles of deglutition accompanied by a spasm of the larynx.

CASE III.—Peter W., aged forty-eight years, a well-developed and muscular negro, was brought by the police patrol to St. Agnes Hospital, July 15, 1890, the attack having come on him suddenly while at work. His family history was good, with the exception of the death of his mother from phthisis. He had had "typhoid pneumonia" nine years previously, and had had the ordinary diseases of childhood. He stated that ever since birth he had suffered from "cramps" about once a year, but that for the last few years they had occurred more frequently. He had an attack in the autumn of 1889, another in May, 1890, and a third two weeks before coming to the hospital. They consisted of muscular cramps which were sometimes very painful and which usually began in the hands or feet and extended throughout the body.

The feet would be drawn into dorsal flexion, the knees and hips extended and stiff, the thumbs bent into the palms and the fingers closed tightly over them, the wrists flexed, the elbows flexed and drawn to the sides, and the head held stiff. The jaws would be tightly closed, or sometimes could be opened and not shut again. The breathing would be painful and difficult, and the man feel as though each moment would be his last. The attack would come on slowly and increase in severity. At its height the spasms would be somewhat remittent, lasting some minutes, and then partially relaxing, while the greatest intensity of the pain shifted from one part of the body to another. The whole duration of an attack would be four or five hours.

When admitted he was in great pain and bathed in profuse perspiration. He had a temperature of 97° F., and a full and strong pulse. He was unable to pass water. The spasm and pain made walking impossible. The muscles of the neck, back, and extremities were involved, but particularly those of the latter. The neck was stiff and there was occasionally slight arching of the back, the weight resting mainly on the shoulders and the nates. The muscles of the calves were as hard as iron and the pectorals stood out like eggs under the skin. The individual paroxysms lasted one or two minutes and were followed by complete relaxation, lasting five or ten minutes. An exceedingly anxious expression of face accompanied the onset of the convulsions, which the man dreaded greatly. The spasm never seemed to be present with equal severity everywhere at once, but showed its greatest intensity now in one portion of the body and now in another. The upper extremities, however, were much more frequently attacked. A curious feature of the case was the fact that if the forearm or leg happened to be in the position of extension at the time of the onset of a spasm, the member stiffened in that position; and the converse was true if it was in flexion. There was no affection of speech. The patient appeared able to open the mouth and move the tongue readily. Percussion of the pectoral muscles during the intermissions produced a momentary vigorous contraction. There was marked anæsthesia of the lower portion of the body as far upward as the umbilicus, the man being unable to feel the prick of a pin.

The spasms diminished in intensity in the course of a couple of hours, after hypodermatic injections of morphine and atropine had been admin-

istered; but they returned later in the day, and appeared even through the next day, the 16th, although with less severity and frequency. On the 17th he felt sore all over and the muscles were tender, but there was no more spasm. Nothing abnormal was found on physical examination of the chest and abdomen. The thyroid gland was unaltered. On the 19th it was observed that compression of the upper arm produced a cramp-like pain in the forearm and a flexion of the wrist. This was relieved when the pressure was removed and friction of the muscles employed. The abdominal, cremasteric, and plantar reflexes were normal. The knee-jerk was absent, even with reinforcement. Efforts to induce ankle-clonus produced slight cramp in the calf muscles. Pressure over the exit of the facial nerve was followed by slight twitching of the muscles of the face.

The man had no more trouble while under observation. On the 23d, eight days after admission, it was noticed that there was no longer any anæsthesia of the lower extremities. The knee-jerk was still absent. The course of the attack had been afebrile. About a week after his entrance into the hospital, Dr. G. Betton Massey kindly tested his electrical reactions for me. There was found distinct quantitative increase of the general electrical excitability of the muscles. This was not more marked in any one muscle than in others. No qualitative changes were discovered and the normal formula was invariably present. There was "a decided increase in the electro-muscular sensation, a gentle contraction causing a pain that resembled that of the tetanic attacks."

This instance of tetany is the only one of my cases occurring in an adult, and even here the disease began very early in life. The case is of interest on account of the severity and the wide extent of the spasms. The contraction caused by tapping the pectorals is an instance of the mechanical irritability common in this disease, as is the well-known facialis symptom of Chvostek, also present in this case. Trousseau's symptom—the production of spasm by pressure upon the artery or nerve, especially of the arm—and the increased electrical excitability—Erb's symptom—were also witnessed. Inability to urinate, from which the man at first suffered, and anæsthesia have been recorded by others also as occurring in this disease. The closing of the fingers over the thumb is not so common as the extension at the metacarpo-phalangeal joints.

Case IV.—Emily W., aged three and one-half years. She was stated to have had good health until the occurrence of severe diphtheria four months before. As she was convalescing palsy set in, involving principally the muscles of the pharynx and lower extremities. Nearly fatal heart-failure is said to have occurred on several occasions. There was no history of the existence of any pain. She recovered very slowly from this condition, and by the end of twelve or fourteen weeks from the onset of the diphtheria she could walk only a few steps. Soon after this she was taken while in church with a severe attack of fainting and had to be carried home. In the afternoon of the same day fever developed and continued during three days. Then, for three days she suffered constantly with great pain, especially when handled. She seemed unable

to get into any comfortable position. The pain then suddenly and entirely ceased and simultaneously the hands passed into the bent position, which was, it is said, as marked at the beginning as when I first saw her. Pain did not recur except on passive motion. This condition persisted without intermission for three weeks, during which she was kept in bed; and she was then placed in the wards of the Children's Hospital, October 11, 1892.

On examination, she was found to be a well-developed though decidedly irritable and somewhat delicate-looking child. There was no evidence of rickets. She sat in apparent comfort in bed. The hands were flexed at the wrist to quite a right angle, as shown in the illustration,

FIG. 1.

and the skin over the joint was tense, red, and somewhat œdematous. The fingers were flexed at the metacarpo-phalangeal articulations, but extended elsewhere. They were also decidedly adducted toward each other, the middle and ring fingers overlapping the others to some extent. The thumb was flexed into the palm, but its terminal phalanx was in extension and protruded between the middle and ring fingers. The feet were extended; the effort to flex them seemed to give pain, but the irritability of the child rendered it difficult to determine how much actual suffering was produced. It was clear, however, that the manipulation of the hands was very painful. The knee-jerks were absent. Rest in bed and bromide of potash were ordered for about a week, but without benefit, and iodide of potash was equally useless.

No change could be observed in the condition for some weeks. Even during sleep the contraction continued, and attempts made to overcome it roused the child with the pain. The patient's irritability and the constant contraction at the wrist prevented at this time any successful attempt to bring on a spasm by compression of the upper arm. Tapping or stroking the face in front of the ear was not followed by muscular contraction. On several occasions the endeavor was made to determine the electrical reactions, but without success, owing to the fear and crying which resulted.

On November 2d, six weeks after the onset of the attack, the child permitted the extension of her hands to a considerable degree and without complaint, if her attention were diverted. She kept them, however, when at rest, in the same position as at first, and was as little able to use them. Persistent careful efforts were now daily made to straighten the

hands by manipulation and by placing large balls of raw cotton in the palms. By November 8th there was decided lessening of the spasm, perhaps the result of great improvement in the general health. By November 14th, eight weeks after the onset, the hands were almost entirely relaxed, and, although the thumbs were still in the palms, the child could handle a doll awkwardly. On this date firm compression of the upper arm caused complaint of pain and a slight increase in the flexion of the hand. The feet were no longer extended.

She now improved rapidly, and by December 1st was practically well. When she first recommenced walking, on November 20th, she complained of pain in the feet and cried when they were handled. Later, she developed at different times measles, pertussis, and severe ulcerous stomatitis, but without the return of the tetany, and on May 15th she was in excellent condition, hearty, and well-nourished.

This case is in some respects an interesting one. The position of the wrists in constant flexion, combined with the history of former paralyses, suggested the possibility of a wrist-drop resulting from the diphtheria. A brief study of the patient, however, showed that there was positive contracture. Other interesting features were the sudden cessation of a three days' severe pain simultaneously with the development of extreme contraction; the persistent absence of the facialis symptom and of any discoverable cause for the tetany other than the diphtheria weeks before. The presence of œdema of the articulations is a common feature where the flexion is persistent.

Case V.—Emma S., six weeks old, was brought to the Children's Clinic of the Hospital of the University of Pennsylvania on December 6, 1892. She had been fed at the breast and was fairly well nourished. She had had no illnesses, except occasional colic and eructation of gas, and she had not been fretful. Two weeks previously the mother had noticed that the child cried whenever picked up or when its legs were moved, and that its knees were constantly held flexed. She stated that this condition had persisted without intermission, and that the effort to straighten the joints caused crying.

The examination made on December 6th showed that the knees were partially but not rigidly flexed, and that efforts to extend them were painful and caused the hamstring tendons to stand out as hard cords, and the tissues over the knee-caps to appear baggy and wrinkled—apparently the result of stretching by the constant flexion. The knee-jerks were normal. Further physical examination revealed nothing out of the way. The child was ordered bromide of potash and antipyrine, with inunctions of warm oil over the tense tendons. By December 13th, one week later, the legs could be extended more easily and with less pain. Former treatment was replaced by a cough mixture, which a slight bronchitis demanded. By December 19th the legs were decidedly better and the child could herself extend them to a considerable degree. By December 28th, three weeks from the first visit, the legs were still improving, but the baby was losing weight. It had been suffering for a week from diarrhœa, vomiting, and colic, and the mother's milk was rapidly growing so thin and insufficient that artificial feeding

was deemed necessary. After this date the legs continued to improve; the gastro-enteric symptoms became temporarily better, but soon returned with increased force. On or before January 11th—*i. e.*, about a month after the first visit—the legs were completely relaxed; but on this date the arms became rigidly flexed at the elbows, the wrists slightly bent, and the thumbs drawn into the palms. When seen two days later the condition was a little better: the flexion of the left elbow had ceased, the fingers were freely movable, but the thumb was still incurved. On the right side the elbow was still bent, the wrist not so much; the fingers overlapped each other and were strongly flexed over the thumb. Efforts to straighten the right arm caused pain. Compression of the left arm was not followed by contraction, and neither pressure over the exit of the facial nerve nor stroking with the finger in front of the ear had any effect. The knees were still free from spasm. There was severe bronchitis in addition to the vomiting. Electrical examination made about this date by Dr. Evans, of the Clinic for Nervous Diseases of the University of Pennsylvania, showed a quantitative diminution of both faradic and galvanic contractility, but no alteration of the formula.

For two months from this time, *i. e.*, until the middle of March, the child lost ground steadily in health and became greatly emaciated, although vomiting occurred only occasionally and there was no diarrhœa. A flat, papular, widely-diffused syphiloderm had made its appearance. The tetany had returned in the left arm, and the elbows of both sides remained always more or less flexed, the thumbs always bent in and the fingers generally clasped over them, and only movable with considerable force. The wrists were not flexed and the knees were only occasionally bent. The feet had assumed the position of marked dorsal flexion, and retained this much of the time. Efforts to straighten the arms always caused pain. After the middle of March the child's general health began to improve rapidly and the tetany grew much less evident. By March 27th, three and a half months after the first visit, it had gained much in nutrition and weight, although still a miserable specimen. The eruption had spread. The elbows were still slightly flexed; the thumbs were constantly in the palms, and the child cried when they were forcibly withdrawn. There was no spasm elsewhere. Trousseau's and the facialis symptoms could not be obtained.

Up to May 1st the baby had continued to improve, and the contractures by this date were entirely gone except in the thumbs, which were still always flexed into the palms, although not so firmly as before. The eruption was disappearing under the influence of mercurial inunctions. Soon after this a change in the food brought on a return of vomiting, together with a reappearance of the contractures in both elbows. The weather was now hot, and the patient became exhausted, although vomiting had ceased. It died on May 24th, six months after the onset of the tetany. There was no autopsy.

This case is peculiar in several respects. The contracture starting at the knee-joint and persisting there for weeks without involving other parts is certainly an unusual mode of onset. The suspicion was at first aroused that the condition was one of congenital contraction of the tendons; but the later development of contractures at the wrists and elbows, apparently consecutive to gastro-enteric disturbance, made the diagnosis

of tetany reasonably sure. Possibly the quantitative diminution of the electrical excitability may have been due to the great muscular wasting. The case is, for the most part, an instance of continuous spasm. The flexion of the wrists lasted scarcely two days and may be called intermittent. The contraction at the elbows was continuous, although with decided remissions and exacerbations. The contraction at the knees was continuous until they gradually assumed the normal position, after which it became distinctly intermittent. The flexion of the thumbs was obstinately continuous for at least four months.

One is surprised at the paucity of records of tetany to be found in the medical literature of America. I have made a somewhat extended search for cases, both under the heading of tetany and under those of trismus, laryngismus, spasm, and so on, lest some instances of the first-mentioned disorder should be concealed under the names of the others. Undoubtedly numerous cases have occurred which have not been recognized by physicians, and still more, although recognized, have never been published. Undoubtedly, too, I have overlooked the reports of many. Still, the results of the search prove that tetany is undoubtedly comparatively rare in this hemisphere.

For reasons already indicated I have included cases of so-called carpo-pedal spasm, except such as were clearly the immediate prodromal evidences of eclampsia and certainly attended by unconsciousness; for the study even of the few American cases shows that it is impossible to regard carpo-pedal spasm as other than a mild exhibition of tetany.

The following are brief abstracts of the 72 cases which I have been able to collect, arranged, as far as possible, in chronological order—at least as far as the year of publication is concerned. It has been found impossible in these abstracts to make a sharp distinction between "continuous" and "intermittent" contractions. For the sake of convenience I have rather arbitrarily denominated those spasms as continuous which appear to have lasted uninterruptedly for more than two days, and those as intermittent which did not last longer than two days without permanent or temporary disappearance.

The Roman numerals are employed to designate the cases reported with more or less detail. The capital letters, in parentheses, indicate the brief references without description which have been made to cases other than these.

I. 1833. Eberle (*Diseases and Physical Education of Children*, 1833, 527).—Healthy child of nine months. Repeated attacks of laryngismus. "Spasmodic affection of the respiratory muscles" and opisthotonos lasting ten to twelve minutes. Feet and hands in typical continuous contraction.

II. 1844. A. F. Axson (*New Orleans Med. Journ.*, 1844, i. 45).—Girl, four months. Dentition thought to be cause. Attacks of laryn-

gismus, sometimes with retraction of head; flexion of thumbs into palms; flexion of toes. Spasms last one-half to two minutes; occur often in day. Treated by cold to head.

III to VI. 1844. J. P. Epperson (*West. Journ. of Med. and Surg.*, 1844, 2d S., ii. 25).—Four children in one family; colored; all under one year. Frequent attacks of laryngismus, lasting few seconds or minutes; later with strabismus, continuous characteristic spasm of feet and hands, and occasionally slight spasm of arms and legs. Treated successfully with stramonium.

(A.) Three other children in this family had earlier died from same condition.

VII. 1848. J. F. Meigs (*Diseases of Children*, 1st ed., 1848, 424).—Boy, seven months. Chronic intestinal derangement. Continuous spasm of hands and feet, with swelling, lasting four months. Occasional spasmodic movements of face, arms, and body. Laryngismus frequent.

VIII. 1848. J. F. Meigs (*Ibid.*, 429).—Child, two years. Attack of tonic flexion of toes lasting a few hours; relieved by purgative.

IX. 1850. C. D. Meigs (*Diseases of Children*, 1850, p. 167).—Boy, six months. Frequent attacks of laryngismus simultaneously with intermittent contractions of hands and feet, opisthotonos, turning of head to right, general rigidity, and finally with development of general convulsions. Death in couple of weeks or less.

X. 1853. J. F. Meigs (*Diseases of Children*, 1853, 2d ed., 463).—Child, nine months; delicate; persistent digestive disturbance; open wound. General convulsions followed in few days by painful tonic characteristic spasms of hands and feet, nearly continuous for two months, with occasional remissions. Occasional tonic, chiefly intermittent, spasm of arms and thighs, and retraction of head and trunk. Later a relapse with laryngismus.

(B.) In a later edition Meigs and Pepper (*Diseases of Children*, 1870, 4th ed., 529) refer to "two other cases" in which the contraction was decided, but lasted a short time only. One of these is possibly Case VIII., detailed above.

XI. 1858. W. J. Kincaid (*Transac. Ohio State Med. Soc.*, 1858, xiii. 69).—Boy, four and a half months. For weeks had had laryngismus badly; then also began to have hands and feet spasmodically flexed in some severer attacks. Cured by cannabis and chloroform internally.

XII. 1859. R. R. McMeens (*Cincin. Lancet and Observ.*, 1859, ii. 457).—Boy, twelve months. Well developed. Dentition and digestive disturbances considered the cause. Subject to laryngismus. Developed in addition characteristic [continuous?] spasm of hands and feet, with persistent flexion and partial paralysis of upper and lower extremities. Recovered.

XIII. 1862. V. J. Fourgeaud (*Pacific Med. and Surg. Journ.*, 1862, v. 303).—Girl of nineteen months. No cause discoverable except general weakness and emaciation. Nearly persistent tonic spasm of lower half of body; momentary partial relaxations. No evidence of pain. Spasm present during sleep. Spasm gradually became intermittent. Whole duration about six weeks. Disease at first simulated a spinal spastic palsy, as legs were crossed.

XIV. 1866. L. H. Carpio (*Gac. Méd. de México*, 1866, ii. 222).—Blacksmith, fifty years old. Superficial wound of abdomen, and few hours later abundant sweating; slight trismus of left side with powerful

painful contractions of left side of neck. Paroxysms intermittent; induced by moving head or coughing. Entire relaxation and no pain between paroxysms. Attacks ceased in five days.

XV. 1871. Arnold (*Balt. Med. Journ. and Bull.*, 1871, ii. 347).—Nursing woman of thirty-two years. [Appears to have been intermittent] tetany of left side of face, right arm, and slightly of right leg. Sometimes pain in nape of neck. Trousseau's sign present. [Report very incomplete.]

XVI. 1871. Zuñiga (*Gac. Méd. de México*, 1871, vi. 377).—Blacksmith, twenty years; old suppurating wound. Exhibited trismus, tetanic physiognomy, copious sweating, spasm of muscles of abdomen, neck, trunk, and lower limbs. Difficult respiration [spasm of intercostal muscles?]. Trismus chiefly persistent. Other contractions more intermittent. Condition had lasted twenty-four days when reported, although improving under chloral.

(C.) Zuñiga (*Ibid.*) says that another case of tetany had been in the hospital a few days before.

XVII. 1872. W. R. Nichols (*Canada Med. Journ.*, 1872, viii. 161).—Boy, sixteen years. Gradual onset; no cause given. Trismus, contortion of face, spasm of muscles of neck and back [opisthotonos], abdomen, and limbs. [No notes regarding hands and feet.] Pupils dilated and oscillating; strabismus; difficulty in swallowing. Spasm continuous, with remissions only. Excitement made worse; no cramp-like pain. Trousseau's symptom present. Recovered after three weeks' treatment with iodide of potash followed by bromide of potash.

XVIII. 1875. M. Alfaro (*An. Asoc. Larry, México*, 1875, i. 97).—Healthy man, thirty years. Slight faintness and tingling in lower limbs ushered in general tetanic rigidity with trismus, distorted features, contracted pupils, adduction of thumbs, extension of feet, legs, thighs, and arms. Respiration interfered with. Four attacks in a few hours, each lasting ten to fifteen minutes. Similar attacks since age of fifteen; first shortly after death of mother; others usually after psychic disturbance.

XIX. 1876. J. S. Green (*Transac. N. Y. Obstet. Soc.*, 1876–78, i. 160).—Delicate girl, four years old. After an attack of diarrhœa there developed intermittent spasms of feet, legs, hands, and forearms, lasting two to five minutes, with some degree of persistence between them. In one paroxysm there was opisthotonos. Position of hands characteristic. Paroxysms so painful that anæsthesia with chloroform required for six hours. Disease lasted in all about forty-eight hours.

XX. 1877. N. B. Emerson (*Transac. Amer. Neurolog. Assoc.*, 1877, ii. 179).—Girl, twelve years. After suppression of first menstruation there was pain in right arm and leg followed by continuous contraction lasting a few days. Hands and feet in characteristic position. Then similar attack of left side, preceded by numbness and tingling. Salicylic acid followed by recovery. [As a result?]

XXI. 1877. N. B. Emerson (*Ibid.*).—Male, eighteen years; delicate. Disease began at age of four years, possibly then associated with some affection of brain or cord. Painful spasm, sometimes one arm, sometimes whole body; oftenest arm and leg of one side. Contraction continuous night and day and characteristic; lasted usually two to three days up to ten days. Respiration sometimes difficult. Attack generally preceded by numbness and evidences of indigestion. Trousseau's symp-

tom not obtained; perhaps result of chloral given. Recovery under use of conium.

XXII. 1879. S. Weir Mitchell (*New York Med. Record*, 1879, xv. 604).—This and the following case seem very probably anomalous instances of tetany. The writer gives them no name, but describes them as due to obscure functional conditions.

Boy, seventeen years; fair health. Forty-eight hours after exposure to intense heat had dull pain in the legs followed next day by great, continuous rigidity of legs. Passive motion caused pain. Recovery in three weeks.

XXIII. 1879. S. Weir Mitchell (*Ibid.*).—Man, forty-three years, well developed. Pain in back and legs, with increasing stiffness, followed in a few hours by fully-developed attack. Legs extended, moderately stiff; but least handling caused severe, intensely painful spasms of legs, feet, and abdominal muscles. Recovery in sixteen hours under narcotics. Two previous similar attacks.

XXIV. 1879. C. K. Mills (*New York Med. Rec.*, 1879, xvi. 218).—Girl, thirteen years. Rheumatism, and later diarrhœa. Painful continuous spasm of extremities; elbows flexed; wrists flexed and abducted; thighs and feet extended. Handling left parts painful; knee-jerks increased. Recovered in two weeks with cure of diarrhœa by silver and opium.

XXV. 1879. H. P. V. Petershausen (*Detroit Lancet*, 1879–80, iii. 248).—Man, twenty-eight years; healthy; history of blow on head, possibly connected with the tetany. Disease had lasted six years. At one time there had been a very persistent hemiplegic condition, which finally disappeared. When seen were intermittent paroxysms of left arm and hand, neck, and facial muscles, every three or four minutes, lasting thirty to one hundred seconds. [Not clear whether legs involved.] Some œdema of hands and face. Attacks preceded by stiffness and pain. Some paralysis of left arm and difficulty of speech during paroxysms and intermissions. Recovery in four weeks under chloral.

XXVI. 1880. A. H. Sowers (*Proc. Nebraska Med. Soc.*, 1877–80, 186).—Adult male; subject to severe dyspepsia; had a fall and suffered some shock, and a few days later tetany developed. Intermittent spasm of whole right side, with slow respiration. Pain in head and staring expression; disposition to sleep. Disease had lasted three months.

XXVII. 1882. J. O. Hirschfelder (*Pacific Med. and Surg. Journ.*, 1881–82, xiv. 385).—Adult male; fall in elevator five days before first attack. Symptoms not detailed, but Hirschfelder showed to his class that pressure on axillary nerve produced general rigidity, retraction of head, and well-marked tetanic convulsions; relieved when pressure was removed.

XXVIII. 1884. I. W. Smith (*Amer. Journ. Obstet.*, 1884, xvii. 438).—[Case reported under title "Trismus Nascentium;" possibly an instance of tetany.] Child three days old. Continuous flexion of lower limbs; inversion of feet; distortion of features; fingers variously distorted; spasm increased by efforts at passive motion. [No trismus mentioned, and] child could suckle and swallow from a spoon. Humeri dislocated forward.

XXIX. 1885. J. Stewart (*Med. News*, 1885, xlvii. 50; later, more completely, in *Transac. Assoc. Amer. Phys.*, 1889, iv. 33).—Male, thirty-nine years; long suffered from chronic diarrhœa. No trace of thyroid

gland. Attacks exhibited double vision; intermittent characteristic spasm of hands, adduction of arms, flexion of forearms; contraction of facial muscles, and occasionally spasm of lower extremities. Numbness, pain, swelling, and sometimes herpes of hands. Attacks recurred for about ten days. Disease had lasted eight years. Increase of galvanic and of mechanical excitability. No reaction of degeneration. Knee-jerk increased during an attack; later, absent or weak.

(D.) W. A. Hammond states in a clinical lecture (*N. E. Med. Monthly*, 1885–86, v. 479) that he has seen a few cases; also, that he is not aware of any cases reported in America.

(E.) G. Ross (*Med. News*, 1885, xlvii. 51) states that he has seen but few cases.

(F.) Godfrey (*Ibid.*, 51) says that he has seen several cases.

XXX. 1886. H. M. Lyman (*Transac. Assoc. Amer. Phys.*, 1886, i. 99).—Delicate man, twenty-eight years. Attacks apt to follow over-eating. Spasm of arms and legs; opisthotonos. Respiration sometimes difficult; occasionally severe headache. Attacks lasted from one to four minutes, and recurred every five to thirty minutes for one or two days; six to eight in a year. Each attack began with forcible beating of right arm against chest.

XXXI. 1886. H. M. Lyman (*Ibid.*).—Nervous man, twenty-two years. Attacks of cramp in left hand, forearm, and sometimes shoulder and side of neck. Intermittent.

XXXII. 1886. H. M. Lyman (*Ibid.*).—Hysterical girl, nineteen years. Exhibited Trousseau's symptom in hand and wrist. [No other note of case.]

XXXIII. 1886. H. M. Lyman (*Ibid.*).—Boy, nine years. Intermittent, painful contractions of flexor muscles of hand and forearm. Fingers flexed over thumb.

XXXIV. 1886. H. M. Lyman (*Ibid.*).—Girl, seven years. Spasm of muscles of neck, arms, hands, feet, and legs, and sometimes of thorax, abdomen, and face. Sometimes laryngismus. Attacks began in hand; three to fifteen paroxysms a day.

(G.) H. M. Lyman (*Ibid.*) states that he has seen the "milder variety of tetany" in young children usually suffering from diarrhœa; characterized by flexion of thumbs into palms, often with fingers flexed over them.

XXXV. 1886. A. Jacobi (*Transac. Assoc. Amer. Phys.*, 1886, i. 106).—Young man in whom act of masturbation always brought on attack. Disease did not appear until age of puberty.

XXXVI. 1886. J. T. Carpenter (*Transac. Assoc. Amer. Phys.*, 1886, i. 105; later, more exactly, in *Ibid.*, 1889, iv. 44).—Boy, thirteen months; abscess. Turning of eyes to one side; typical contraction of arm and hand, first on one side, then on the other; trismus persistent. All spasm relaxed about third day, then returned; death in a week. [This case is very powerfully suggestive of tetanus.]

XXXVII. 1887. F. C. Shattuck (*Boston Med. and Surg. Journ.*, 1887, cxvi. 497).—Healthy boy, nineteen years; had stiffness of jaw for year. This suddenly grew worse, and there appeared numbness, [intermittent (?)] spasm of hands and arms and slightly of legs. Hands in characteristic position. Masseters hard. Pain only on passive movement. Considerable mental excitement. Speech difficult. Trousseau's symptom and increased electrical excitability could not be obtained. Condition relieved in three days under chloral and potassium bromide.

XXXVIII. 1888. H. Hun (*Med. News*, 1888, liii. 415).—Woman, twenty-six years. Suppressed menstruation cause of first attack. Deficient mental power. Disease had lasted two years. At first intermittent spasm, usually in arms and legs; position of hands and feet characteristic. Later continuous, tonic spasm of all the muscles, excepting those of face, persisted even during sleep. Were also paroxysmal painful augmentations of the spasm. Trousseau's symptom present. Facialis symptom absent. The persistent contraction interfered with the study of the reflexes and electrical reactions. No improvement when case published, after nine months of observation.

XXXIX. 1889. J. T. Carpenter (*Transac. Assoc. Amer. Phys.*, 1889, iv. 45).—Girl, eleven months; suppuration of shoulder. Laryngismus and "muscular contractions of tetany." [The paroxysms were evidently intermittent.] Recovered, but liable for several years to attacks after diarrhœa or taking cold.

(H.) F. P. Kinnicutt (*Transac. Assoc. Amer. Phys.*, 1889, iv. 47) remarked in a discussion upon the subject that he had seen two cases of intermittent tetany in connection with great dilatation of the stomach.

(I.) S. Weir Mitchell (*Ibid.*, 50) said that he had seen but two cases. These may have been Cases XXII and XXIII., already detailed.

(J.) W. Pepper (*Ibid.*, 51) stated that he had seen only one case, that being in a child.

(K.) A. Jacobi (*Ibid*, 48) stated that he had met with five cases, and possibly a few more. It may be that one of these was that referred to by him in 1886 (Case XXXV.).

XL. 1889. F. T. Miles (*Transac. Assoc. Amer. Phys.*, 1889, iv. 48).—Woman, twenty-two years. Dilatation of stomach; extreme emaciation. Had had numbness of fingers and toes on several occasions. Developed an attack of tetany with classical position of hands and feet; contraction about face and mouth; rigidity of eyes. Died in twenty-four hours.

XLI. 1889. C. W. Earle (*Transac. Amer. Pædiat. Soc.*, 1889, i. 153).—Girl, two and a half years; indigestion. Characteristic contractions with pain and swelling of hands and feet; muscles of posterior part of legs involved. Spasm continuous. Well in five days. Fomentations and nerve-sedatives.

XLII. 1889. C. W. Earle (*Ibid.*).—Girl, six months. Painful continuous spasm and swelling of hands and feet, lasting ten days.

XLIII. 1889. F. C. Shattuck (*Boston Med. and Surg. Journ.*, 1889, cxxi. 231).—Girl, twenty-one years. Diphtheria when sixteen, followed by tetany. At first attacks in one hand and arm, occurred rarely, lasted one to two minutes; gradually all extremities, more frequent, sometimes lasted an hour. Trousseau's symptom present. No inversion of electrical formula.

XLIV. 1889. S. L. Abbott (*Boston Med. and Surg. Journ.*, 1889, cxxi. 230).—Robust longshoreman, forty-three years. Spasm of all flexors of extremities, and to some extent of muscles about shoulders and abdomen. Occurred often every half-hour; lasted about a half-minute. Excited by muscular effort. Only slight pain. Improved rapidly under urethan.

XLV. 1889. J. L. Smith (*Arch. of Pædiat.*, 1889, vi. 374).—Boy, eleven months; improperly fed; constipated; one tooth. Had had disease for four months. Spasm [apparently continuous] of muscles in all

extremities. Characteristic position of hands. At times spasm of legs and thighs. Attacks of laryngismus. Spasm continued during sleep. Recovered under potassium bromide and relief of constipation.

XLVI. 1889. J. L. Smith (*Ibid.*, 376).—Well-nourished child, twenty months. Dentition thought to have been the cause. Five teeth prominent at once under swollen gums. Flexion of left leg and thigh; [apparently continuous] for three weeks. Spasm present during sleep.

XLVII. 1889. J. L. Smith (*Ibid.*, 469).—Woman, thirty-nine years. Exposure to cold, wet, and fatigue. Intermittent pain from ankles to knees; in four months, constant; shortly after had continuous flexion of fingers, extension of feet, and flexion of toes. Spasm present during sleep. Sensation in toes nearly lost. Sphincter ani paralyzed for a time. Perspiration of extremities. Spasm of hands well in six months; that of feet still continuing after a year.

XLVIII. 1889. J. L. Smith (*Ibid.*, 472).—Girl, ten and a half months. Severe acute diarrhœa, followed by characteristic spasm of hands and feet with œdema. Several paroxysms during six days, each lasting a day or two, and present during sleep. Had attack of eclampsia on fourth day of disease. Treated with bromides and chloral and attention to bowels.

XLIX. 1889. J. L. Smith (*Ibid.*, 473).—Boy, fifteen months. Rickets; tendency to diarrhœa; earlier, an inclination to hold breath. Had had nearly continuous characteristic spasm of hands and feet for three months. Spasm present during sleep. Recovery under attention to diet and administration of zinc and atropine.

L. 1890. A. Abrams (*Occid. Med. Times*, 1890, iv. 14).—Man, twenty-four years; excessive smoker; dilatation of stomach. Painless spasms in left arm and sometimes also in left leg; rarely right arm alone. Sometimes occurred every day at hourly intervals. Violent movements provoked them. Impairment of all forms of sensation in left arm and leg. At times formication and coldness constituted prodromes. Left knee-jerk slightly increased. Trousseau's and Chvostek's symptoms and increase of electrical excitability present. Great exhaustion after attacks.

LI. 1890. J. Schneck (*Journ. Amer. Med. Assoc.*, 1890, xv. 387).—Girl, ten years. Disease had lasted two years. At first vertigo, with spasm of lower limbs; later only spasm of upper extremities, neck, jaws, and occasionally opisthotonos. Swallowing and speech interfered with; some pain attended. Hands and arms in classical position. Paroxysms averaged ten daily, each lasting a couple of minutes. Tinnitus, formication and numbness followed them. Trousseau's and Chvostek's symptoms and knee-jerk absent. Argyll-Robertson's pupil present. Disease disappeared in five or six weeks under conium and nitroglycerin.

LII. 1891. E. H. Small (*St. Louis Med. and Surg. Journ.*, 1891, lx. 271; also in several other journals).—Boy, eleven months. Rickets; digestive disturbance. Characteristic continuous spasm, at first painful, of hands and feet, with œdema and cyanosis. In week recovery under fomentations, potassium bromide, and attention to bowels.

LIII. 1892. N. E. Remmen (*Chicago Med. Recorder*, 1892, iii. 240).—Girl, fourteen years. Adenoid growths in naso-pharynx, with poor mental development. Painful spasms of extremities and rigidity of whole body, lasting five minutes and occurring every two months. Disease had lasted two years. Trousseau's and Chvostek's symptoms well marked.

LIV. 1892. S. S. Adams (*Arch. of Pædiat.*, 1892, ix. 881).—Boy,

four months; digestive disturbances, phimosis, possibly rhachitis. Laryngismus and, several times, eclampsia. Later "snapping of lids," rolling eyes, flexion of thumbs into palms, and general rigidity attending laryngismus. These attacks several times daily. Death shortly after from laryngismus.

LV. 1892. W. S. Bowen (*Med. News*, 1892, lx. 434).—Girl, six days old, when she developed attacks of laryngismus with spasm of nearly all muscles of body; opisthotonos and characteristic position of extremities. Lasted about one minute; repeated frequently. [Clearly no trismus. No cause, unless wound left by dropping of cord on fifth day.]

LVI. 1893. B. E. Vaughn (*New York Med. Journ.*, 1893, lviii. 757).—This and the following six cases are instances of epidemic tetany; five of them were in one family; all were Italians living under most unfavorable conditions of dampness and bad air.

Woman, thirty-five years. Nursing; damp, close dwelling. Formication in feet extending to head, neck, and finally hands, with constipation and abdominal pain. Then characteristic spasms in upper extremities, and later in feet, three to four a day, each about one hour. Increased electrical excitability. Disease had lasted three months when first seen. Quinine cured in eighteen hours.

LVII. 1893. B. E. Vaughn (*Ibid.*).—Girl, fourteen years; just beginning to menstruate. Daughter of Case LVI. and developed disease two weeks later. Same exposure to dampness. Formication preceded onset of spasms, which were nearly continuous, relaxing only once or twice a week for a couple of hours. Position of hands and arms characteristic. Rapid recovery under quinine.

LVIII. 1893. B. E. Vaughn (*Ibid.*).—Girl, three years; rickets; same exposure to dampness as with mother (Case LVI.), and disease began about same time. Spasm in upper extremities twice a week only. Recovery under quinine.

LIX. 1893. B. E. Vaughn (*Ibid.*).—Girl, twelve years; menstruation recently established; lives in damp house with mother (Case LVI.). Formications, abdominal pain, and constipation as in that case; then continuous characteristic spasm of upper extremities. Trousseau's symptom present. Disease had lasted about two months. Recovered in less than twenty-four hours under quinine.

LX. 1893. B. E. Vaughn (*Ibid.*).—Woman, thirty-three years. Nursing; damp dwelling. Formications, as in Case LVI., for three weeks. Contractions [apparently continuous] began two days before seen. Were increased by pressure on brachial plexus. Disappeared after sixteen grains of quinine in two doses.

LXI. 1893. B. E. Vaughn (*Ibid.*).—Woman, twenty-five years. Damp dwelling; nursing; anæmic, looked sick, had fever and enlarged spleen. Formication as in Case LVI. Contractions [apparently continuous] in fingers and hands began four days before seen. Trousseau's symptom present. Recovered in less than twenty-four hours under quinine.

LXII. 1893. B. E. Vaughn (*Ibid.*).—Man, working in damp place; had typical spasm in both hands and feet.

(L.) B. E. Vaughn (*Ibid.*) states that quite a number of other cases came to the morning Italian class of the New York Dispensary; those reported above having been seen in the afternoon hour.

LXIII. 1893. A. S. Fraser (*Canadian Practitioner*, 1893, xviii.

500).—Man, thirty years. Severe dyspepsia due to cirrhosis of stomach as shown by autopsy. After acute indigestion developed intermittent spasm of muscles of face and extremities, with characteristic position of hands. Spasm lasted one to two minutes; had four in an hour; fifth stopped by puncture with hypodermatic needle. Then occasional slight spasms of extremities for some months, with declining health. Then death, preceded by severe spasms of extremities during three days.

LXIV. 1893. J. W. McConnell (*Journ. Nerv. and Ment. Dis.*, 1893, xx. 418).—Woman, thirty-three years. Took general cold. Numbness, pricking, and vague pain, followed by spasm of extremities, neck, abdomen, and zygomatics; tongue stiff, speech and respiration difficult. Muscles alternately relaxed and contracted during about one hour. Voluntary motion increased the spasm. Trousseau's symptom present. A second attack within twenty-four hours.

LXV. 1893. A. Jacobi (*Arch. of Pædiat.*, 1893, x. 1042).—Boy, three years; poorly developed; convulsions at seven months. Fingers bent and thumbs flexed into palms. [Not stated how long this lasted.] Considers chronic meningitis the cause.

LXVI. 1893. A. Jacobi (*Ibid.*, 1055).—Colored child [baby?]; disturbed digestion or exposure apt to be followed by muscular spasms especially in the hands, with a "peculiar forced position of the limb lasting a day or two." Spasm returning perhaps in a week.

LXVII. 1893. D. J. Evans (*Montreal Med. Journ.*, 1893, xxii. 183).—Girl, seventeen months, colored; rickets. Characteristic spasm of hands and feet, with œdema, continuing ten days, then gradually relaxing. Facial reflex present; knee-jerk exaggerated; no pain. Tonic and dietetic treatment.

LXVIII. 1893. D. J. Evans (*Ibid.*).—Girl, ten months. Chronic diarrhœa, debility, probably syphilis. Five other children had died of convulsions. Continuous spasm of hands and feet, with exacerbations, lasting five days. No facial reflex. Dietetic treatment and potassium bromide.

LXIX. 1893. S. Brown (*North Amer. Practitioner*, 1893, v. 66).—Man, twenty-four years. Exposure to wet and fatigue. Painful spasm in calves and feet, lasting about half an hour, and occurring frequently for three days; worse at night. Increased galvanic excitability. Inversion of formula. Trousseau's symptom absent.

LXX. 1893. S. Brown (*Ibid.*).—Young man. Tingling of whole right side and spasm of right arm with flexed elbow and closed hand. Spasms lasted one to two minutes, and usually occurred four to five times before breakfast, and occasionally one or more times during the day. Increased galvanic excitability, inversion of formula and Trousseau's symptom present. Disease had lasted six weeks. Recovery in six days under potassium bromide and galvanism.

LXXI. 1893. S. Brown (*Ibid.*).—Man, twenty-seven years. Exposure to bad weather. Spasm on both "sides" [probably legs meant], lasting several months. [Not stated whether intermittent or continuous.] Says symptoms were well marked, and electrical examination confirmed the diagnosis.

LXXII. 1894. M. H. Fussell (*Univ. Med. Magazine*, 1894, vi. 229).—Girl, five years. Indigestion apt to induce laryngismus and painful characteristic contraction of hands and feet with flexion of elbows, retraction of head, and strabismus. Spasm continuous during a few days,

then disappearing a few days. Exertion made worse; diversion of mind caused nearly to disappear. Trousseau's symptom and knee-jerk absent. Chvostek's symptom present. Disease occurred during several years, especially in spring and fall. Typical epilepsy later in course of case. Death from atelectasis resulting from laryngismus.

Some little analysis of these cases may be of value. Those which offer themselves as at all suitable for this purpose are the ones designated by the Roman numerals. They equal 72 cases in all. I have not included my own cases in this analysis, since they do not come in the category of those already published.

Conclusions drawn from the cases can only have a relative value, particularly where figures are concerned. This is true both because some doubtful instances of the disease are included in the list, and because many of the reports are incomplete or the meaning of the writers obscure.

In considering the etiology of the published cases we find that 34 of the patients were of or above the age of puberty when the disease first developed, including 3 girls in whom menstruation had just been established; 13 were children from two years of age to puberty; 25 were under two years of age, and 20 of these less than one year old.

33 of the patients were male, 29 female, and in 10 the sex is not stated.

Among the possible causes mentioned or implied, I find lactation (4 cases); open wounds (6); psychic disturbance, including 2 instances of shock from falls (3); menstruation, developing or suppressed (4); possible affection of the brain (3); digestive disturbances, including 2 cases of dilatation of the stomach (23); rheumatism or exposure to cold and wet (13); exposure to heat (1); diphtheria (1); dentition (3); syphilis (1); masturbation (1); absence of the thyroid (1); rickets (5); adenoid growths of the naso-pharynx (1); phimosis (1). Sometimes two or more of these causes were operative in the same case.

Under the heading of symptomatology we find it stated that pain in the affected part, apparently due to the spasm, was present in 21 cases, and that it was absent or trivial in 6 cases. In the others no reference is made to the subject. Further, we find among the principal symptoms or complications, faintness (3 cases); vertigo (1); herpes (1); tingling, numbness, formication, etc. (15); temporary paralysis (3); anæsthesia (2); disposition to sleep (1); tinnitus (1); epilepsy (1); laryngismus (17); eclampsia (4). European observers find laryngismus and tetany very frequently associated; and Loos, indeed, has maintained that the former is simply a laryngeal manifestation of the latter disease. Cheadle views laryngismus, tetany, and eclampsia as but different expressions of the same morbid condition. Possibly the association of tetany with one or the other or both of these allied affections has occurred in America

oftener than the reports would indicate. It is interesting to notice that 15 of the 17 cases of laryngismus were witnessed in children under one year of age. Also, that in 11 of the cases the contractions were chiefly continuous and in 6 paroxysmal.

No numerical analysis can be made of the position of the spasm in the body, since it varied from an almost universal diffusion to a limitation to one limb. Trismus was present in probably 6 cases; possibly in a few more in which the reports do not make it quite clear. So, too, it is difficult to draw any conclusions with regard to the nature of the spasm, since we find all gradations occurring, and the writers, too, have not always expressed themselves clearly on this point. As nearly as I can determine the spasm was intermittent, in the sense already defined, in 38 cases and continuous in 25 cases. In 1 case (XIII.) it was at first continuous and later intermittent; in 1 (XXXVIII.) it was first intermittent and then continuous; and in 4 cases (I., VII., X., and XXXVI.) it was continuous in one portion of the body and intermittent in another. In 3 cases (LXII., LXV., LXXI.) the authors do not give even a clue to the nature of the spasm.

In only comparatively few cases is there any reference to the presence or absence of Trousseau's symptom and of increased electrical or mechanical excitability as described by Chvostek and Erb respectively.

The treatment, so far as it has been reported, has consisted chiefly in remedies employed as sedatives to the nervous system, or directed against the exciting cause of the disease. But very few cases have been fatal, and these only as the result of complications.

Finally, we can but conclude that the cases reported in America entirely uphold the view enunciated earlier in the paper, viz., that there is no essential difference between the tetany of adults and that of children, or between the continuous and the paroxysmal forms of the disease. The cases quoted in considering the nature of the spasm are all in evidence here. Moreover, continued spasm may exist in persons past the age of childhood (Case XVII.), contrary to the statements of some writers; and intermittent spasms, exactly similar to the commoner tetany of adults, are frequently seen in children. But were there no other instances in proof of the point advanced, the remarkable series of cases published by Vaughn would of themselves be sufficient. Here we find in one family, and at one time, one case (LVI.) of a truly intermittent type, another (LVII.) of a somewhat more continuous form, and a third (LIX.) showing very continuous contraction, yet with Trousseau's symptom present as proof of its true nature.

REPORT OF A CASE OF TRICUSPID STENOSIS ASSOCIATED WITH MITRAL STENOSIS AND AORTIC STENOSIS.

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The occurrence of tricuspid stenosis, while not so very rare, is yet sufficiently uncommon to lead us to believe that a report of the following case, in view of its many interesting features, will not prove uninstructive.

The history is as follows:

W. N., aged nineteen years, a japanner by occupation. Both parents are living and in good health, and in the family of neither is there a history of rheumatism.

The patient appeared to be healthy at birth. When six years of age he had measles, his childhood being otherwise uneventful until his fifteenth year, when he suffered from an attack of influenza. With the latter affection he was ill two weeks, but, while unable to attend to his usual work during that period, was not confined to bed. The chief symptoms of the influenza were referred to the head, bone pains being of very moderate degree. There is no personal history of scarlet fever, nor had the patient at any time suffered from what might be termed a frank attack of rheumatism, although at various times vague pains, somewhat rheumatic in character, had been complained of.

For the six years preceding his death the patient's occupation had been that of a japanner, and therefore one that entailed no very laborious exercise. Throughout his entire childhood he had lived a very quiet and retired life, and never indulged in the active pursuits of his playmates, although there never appeared to be, as his mother stated, any physical incapability. When first he accepted employment, however, in the year 1888, it was remarked that he could not walk to and from the factory, a distance of some thirteen or fourteen blocks, without suffering great fatigue. No especial cardiac symptoms showed themselves, however, until about four years preceding his death when, after a hard day's work, he would frequently complain of præcordial distress and cardiac palpitation associated with easily induced shortness of breath. Upon such occasions the violence of the cardiac impulse had been noticed, and it was of sufficient strength to make itself evident through the several layers of the patient's clothing. At that period, however, his color was good, and there existed no further evidence of ruptured compensation.

The patient first came under observation in the early part of March, 1894, at which time he presented himself for examination as an appli-

cant for life insurance. So far as rational symptoms were concerned, he then appeared to be in the best of health, though the physical examination at once revealed the diseased condition of the heart, the diagnosis at that time being mitral stenosis and mitral incompetency. As such his case is included in a report of a series of cases of chronic valvular disease of the heart read before the College of Physicians of Philadelphia, by Dr. T. G. Ashton, at its meeting held June 6, 1894, and subsequently published in *The Medical News.*

Toward the end of March, 1894, the patient began to show signs of cardiac failure. Upon exertion, especially upon bending over, his face, which usually had a good color, would become decidedly blue, and even the slightest exertion was sufficient to induce shortness of breath.

The patient's habits had always been abstemious; he had never used alcohol or tobacco and, as previously stated, had never taken any interest in athletic exercises.

On June 23, 1894, he first made his appearance at the clinic of the out-patient medical department at the Jefferson Medical College Hospital. The notes of the physical examination made at that time are as follows: Marked cyanosis of the patient's lips, cheeks and hands; dyspnœa evident; puffiness of under eyelids and marked pretibial œdema; the radial pulses were imperceptible, and it was impossible, therefore, to obtain a sphygmographic tracing.

Inspection of the præcordium revealed a greatly extended impulse which was plainly perceived as far as the sixth interspace and one and one-half inches to the left of the nipple; there was marked pulsation in the epigastric region, which also extended well to the right of the sternum.

Upon palpation the cardiac impulse and apex beat were found to possess but little force. A feeble thrill was detected above the apex beat of the heart, the time of occurrence of which was presystolic; no thrill existed over the tricuspid area.

Auscultation at the apex revealed a systolic murmur, soft and of moderate intensity, which was plainly propagated into the left axilla. Above the apex, and at a point corresponding to the thrill above mentioned, was heard a murmur, presystolic in time, harsh in character, and terminating abruptly with what appeared to be the first sound of the heart. At a point below this, upon a level with the apex of the heart but about one and a half inches to the right, it was possible to hear both the systolic and the presystolic murmurs. To the right of the sternum, toward its lower end, was heard a murmur of systolic time and differing in its characteristics from that heard at the apex. There existed no visible pulsation in the veins of the neck, nor was it possible to detect hepatic pulsation.

At the aortic cartilage no murmur was heard save that supposed to have been transmitted from the apex, which, as the great vessels of the neck were approached, disappeared altogether. The pulmonary sounds were clear.

The clinical diagnosis was combined mitral stenosis and incompetency associated with tricuspid incompetency, the latter supposed to have been a relative defect depending upon primary mitral disease.

The specific gravity of the urine was 1017; its reaction acid; it contained no sugar; albumin, however, existed in large amount, but no casts were found.

The patient's condition became so serious that he was unable to return

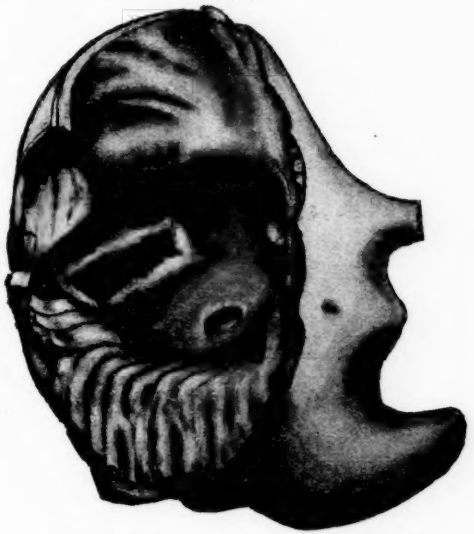
to the hospital, and subsequent treatment was conducted at his home; nevertheless, his symptoms became progressively worse. Toward the end anasarca of the lower extremities became marked, and effusions took place into the abdominal, pleural, and pericardial cavities, while throughout both cyanosis and dyspnœa were extreme.

On July 28, 1894, the patient died.

The autopsy notes read as follows: The body that of a young man, about nineteen years of age. Post-mortem rigidity marked; slight discoloration of the dependent portions of the body; general anasarca, most marked in the lower extremities; abdomen distended; the skin generally extremely white and glistening, due to distention.

Thorax: Upon opening the thoracic cavity the lungs were hidden from view by a greatly distended pericardium. Both pleural cavities contained clear serous fluid; that of the left side three pints, that of the right side about two quarts.

FIG. 1.



Showing narrowing of the tricuspid orifice and intimate adhesion of the three cusps of the valve. Observed from the auricular aspect.

The lungs were partially collapsed and lying in the upper part of the thoracic cavity along the spinal column. The left lung showed considerable œdema and some hypostatic congestion at its base. The right lung was deeply congested, and at its base was a moderate sized area of consolidation, a piece taken from which sinking when placed in water. Neither lung showed any evidence of a recent or old tuberculous process.

The pericardium, upon being opened, was found to be filled with a blood-stained serum, the measured quantity being fifteen ounces. In several places the parietal layer appeared to be adherent to the right auricle.

The heart's right chambers were found to be distended with soft blood-clots, the left side being completely empty. The apex of the right ventricle extended about one inch below that of the left ventricle. Upon the external surface of the right auricle could be seen four small openings, each about 5 mm. in diameter, two being at the upper portion and two near the right auriculo-ventricular boundary. Corresponding points were noted upon the parietal pericardium, denoting that the latter at these places had been adherent to the auricular pericardium.

Upon opening the right auricle it was found to be filled with dark, soft clots; its cavity was much enlarged and its walls thickened. The auriculo-ventricular orifice was much narrowed and would permit the passage of the middle finger only with some difficulty. As observed

FIG. 2.

Showing narrowing of the mitral orifice; the light shading about the orifice and upon the auricular wall denoting calcareous plates. Observed from the auricular aspect.

from the auricular aspect the three cusps of the valve were found to be firmly adherent to each other and very much thickened, resulting in a stenosis of the tricuspid orifice of the button-hole variety. The valve, though thickened, was smooth and free from any calcareous deposits. The cavity of the right ventricle was much enlarged and its walls increased to about 1 cm. in thickness. The pulmonary valves were normal.

The left auricle contained a small quantity of fluid blood, but was not distended. Through the auricle the mitral opening was found to consist of a mere slit, the edges of which were in firm and close approximation, so that even the tip of the little finger could not be inserted into the opening. The valvular ring upon its auricular surface was rough and hard, having many sharp calcareous projections which extended in several places upon the inner surface of the auricular wall. The slit

constituting the mitral opening, being so short and the edges so firmly approximated, could have permitted but a very small quantity of blood to pass through.

The left ventricle was found completely empty; its cavity was greatly reduced in size, and its walls of great thickness. The aortic valve, by the water-test, showed no incompetency. The most extreme grade of aortic stenosis existed; the semilunar leaflets were firmly adherent to one another, resulting in the formation of a funnel-shaped deformity, the small end of which projected into the aorta some distance, and possessed an opening that would no more than admit the tip of a slate-pencil. The aortic orifice also showed some slight degree of atheroma.

FIG. 3.

Showing narrowing of the aortic orifice; the leaflets of the valve adherent together, resulting in a funnel-shaped projection, the narrow end of which points toward the aorta. Observed from the aortic aspect.

The abdomen was found to contain a large quantity of ascitic fluid. The intestines appeared to be normal. The other organs presented the conditions that might be expected to attend an advanced case of cardiac disease in which the right side of the heart had become involved. The liver was enlarged, congested, its lobules distinct, and its tissue upon section dense. The spleen also was enlarged and of increased firmness. The kidneys were somewhat increased in size and congested, the cortices being increased in width; their capsules stripped readily. The remaining abdominal organs were normal.

The accompanying illustrations, made by Dr. Stewart, well represent the various valvular lesions, and add materially to the value of the report.

Especially to Bedford Fenwick, and subsequently to Leudet, are we indebted for whatever of accuracy pertains to our present knowledge concerning tricuspid stenosis. In 1881, 1882, and 1883 Fenwick collected and analyzed before the London Pathological Society a series of seventy cases presenting this lesion, and in his Paris Thesis of 1888 Leudet has collected together, including the cases previously collated by Fenwick, one hundred and fourteen cases, with the results of the autopsies. The results of Leudet's observations as regards the influence

of sex, age, antecedent causal history and the association, or non-association, of other valvular lesions, we have summarized as follows:

Sex.	No.	Age at death.	Previous history.	Associated lesions.
Female	86	2 from 60–64 years. 4 " 50–60 " 14 " 40–50 " 24 " 30–40 " 33 " 20–30 " 3 " 10–20 " 6 ages not mentioned	41 out of 60 cases had antecedent rheumatism; in 54 cases no history was mentioned.	Tricuspid and mitral . . . 78 " mitral, and aortic . . 21 " " and pulmonary 1 " and pulmonary . . 3 " alone 11 114
Male	22	2 from 60–64 years. 2 " 50–60 " 3 " 40–50 " 3 " 30–40 " 6 " 20–30 " 5 " 10–20 " 1 age not mentioned		
Not mentioned	6			

Since the publication of Leudet's Thesis we have found recorded in literature sixteen instances of tricuspid stenosis; but for three of these cases we have been unable to obtain more than the references. An analysis of the remaining thirteen cases and our own, however, offers some interesting comparisons with the results obtained from the above summary of Leudet's cases. Thus, we find these cases offer the following points:

Observer.	Sex.	Age.	Previous history.	Associated lesions.
Shattuck . . .	F.	43	No rheumatism, but alcoholic.	Tricuspid, mitral, aortic, and pulmonary disease.
Chaplin	F.	18	No rheumatism, but scarlet fever.	Tricuspid and mitral stenosis.
Chaplin	F.	Not given.	Rheumatism.	Tricuspid and mitral stenosis.
Vaughan . . .	F.	26	No rheumatism.	Tricuspid and mitral stenosis and aortic vegetations.
Vaughan . . .	F.	50	No rheumatism.	Tricuspid and mitral stenosis and aortic vegetations.
Philip	M.	46	No rheumatism.	Simple tricuspid stenosis.
Gibson	F.	31	Rheumatism.	Tricuspid and mitral stenosis.
Gibson	F.	21	No rheumatism.	" " " "
Balfour	M.	14	" "	" " " "
Thacher	F.	29	" "	Tricuspid, mitral, and aortic stenosis.
Grawitz	M.	24	Not mentioned.	" " " " "
Hay	F.	35	" "	" " " " "
Drummond . . .	F.	40	" "	" " " " "
Ashton and Stewart .	M.	19	Doubtful rheumat.	" " " " "

The above may be summarized as follows:

Sex.	No.	Age at death.	Previous history.	Associated lesions.
F.	10	2 from 41–50 years. 3 " 31–40 " 3 " 21–30 " 1 " 11–20 " 1 not mentioned.	Only 3 out of 11 cases had antecedent rheumatism; in 3 cases no history was mentioned.	Tricuspid and mitral . . . . . 5 " mitral, and aortic . . . 7 " " aortic, and pulmonary . 1 " alone 1
M.	4	46, 24, 19, 14 years.		14

From these tables it will be at once noticed that the preponderance of tricuspid stenosis in the female is striking. Thus, in 108 of the 114 cases collected by Leudet in which the sex of the individual is mentioned, the lesion occurred in 86 females and only 22 males. Adding to these figures the 14 cases collected by ourselves, we find that 96 females were the victims of this lesion, and 26 males, a proportion in favor of the former of nearly 79 per cent. This difference in the liability of the sexes has been remarked by most observers, and Bedford Fenwick states its relative occurrence to be higher than even the above figures would show, claiming that it occurs seven or eight times more frequently in women than in men. The cause for the relatively greater predisposition of the female sex is held by Fenwick to be that the work of women is less laborious, and that in consequence the action of the heart is less powerful. As a result, back-pressure is slighter, and therefore the valve disturbance is less than in men. In men laborious occupations, greater compensatory hypertrophy, and more powerful cardiac action prevent the inflamed edges of the valves from adhering together.

If this explanation be the correct one, it would apply to the case which is the subject of this paper, inasmuch as this patient had always been averse to active exercise and had never followed any occupation entailing excessive exertion and, therefore, heart-strain. For these reasons the back-pressure may have been slight and the valve disturbance of only limited degree, thus permitting of the adhering together of the inflamed edges of the valves. This point if followed up might show that in the majority of the instances of the male sex presenting the lesion of tricuspid stenosis there exists a history of comparative freedom from much muscular strain, and that, therefore, they could in reality be classed with the female sex so far as their predisposition to tricuspid stenosis is concerned. If this should prove to be the fact, it would go far toward confirming the position assumed by Fenwick.

In reference to the age at which death occurs in individuals the subjects of tricuspid stenosis, Leudet states that the decade during which death takes places most frequently is between the ages of twenty and thirty years, and it will be noticed that the cases that we have collated confirm this statement. It will be seen, therefore, that the existence of tricuspid stenosis is unfavorable to a long life. Nevertheless, that it is not absolutely incompatible with a moderate degree of longevity is seen from the fact that in 33 of the 122 cases of which the ages are recorded, death did not happen until after the fortieth year. It cannot be controverted, however, that in tricuspid stenosis, as stated by Leudet in his conclusions, the prognosis is more fatal than in any other form of valvular defect. From the very nature of the affection this cannot but be the case, as with tricuspid stenosis there exists as a primary condition that which occurs only in the last stages of other valvular lesions;

namely, dilatation of the right auricle and consequent venous engorgement. Thus, from the onset in this disease there is a transference of the blood pressure from the arterial to the venous system, and with it engorgement and subsequent structural changes in the viscera.

From the evidence deduced by Leudet it will be seen that the origin of tricuspid stenosis may be either congenital or acquired. Fenwick, however, asserts that the disease is always acquired, probably never congenital, and that in half the cases there is an antecedent history of acute or subacute rheumatism. So, also, Sansom writes: "I consider that it is without doubt the result of an endocarditis of the rheumatic form, causing adhesion and thickening of the curtains of the tricuspid valve and adjacent structures; it may be initiated in intra-uterine life, but is more commonly a development of the endocarditis associated with rheumatism that affects the mitral valve concurrently." Leudet further concludes that tricuspid stenosis in the fœtus is more often due to malformation than to endocarditis, but when endocarditis does occur in intra-uterine life the tricuspid valve is more frequently attacked than the other valves, because during fœtal existence the greater amount of work is placed upon the tricuspid valve.

Whether acquired or congenital, however, there can be no question that the most frequent cause of tricuspid stenosis is an endocarditis of rheumatic origin. In Fenwick's statistics an antecedent history of rheumatism is found to exist in exactly 50 per cent. of the cases. This proportion is even higher in Leudet's cases, 41 out of 60 cases having had antecedent rheumatism, the previous history of the remaining 54 cases not being mentioned. At the lowest estimate, however, rheumatism existed as a morbid cause in over one-third of these cases, and it is fair to assume that in a large proportion of the cases in which the observers failed to mention the antecedent history, rheumatism probably played its usual part. In the 14 cases that we have collected rheumatism had occurred in but 3 of the 10 cases of which the previous history is recorded; and in our own case it is very doubtful whether the somewhat vague "rheumatic pains" from which the patient from time to time suffered could be ascribed to rheumatism. In this case, as will be observed in the clinical notes, no positive history of rheumatism could be obtained as having occurred either to himself or to any member of his family. He had been singularly free from infectious diseases, and but for the mild attack of measles from which he suffered when six years of age, and which is probably the least likely of all the acute affections to attack the endocardium, he presents a history of no disease that might be considered as having caused the extensive endocardial involvement. The possibility must not be overlooked, however, that the so-called rheumatic pains above referred to might in reality have been an evidence of rheumatic infection latent so far as the articular synovial

membranes were concerned, but disastrous in its effects upon the endocardium.

The extraordinary latency in the symptoms of this case is remarkable and bears a striking resemblance to the case reported by Shattuck. The only possible cause in Shattuck's case was an attack of scarlet fever at eleven years of age, the patient not dying until the age of forty-three. Throughout this period a remarkable tolerance was exhibited to the extensive lesions that existed, and which, in reality, involved every valve in the heart; to the slow development and the gradual extension of these lesions Shattuck ascribes the tolerance acquired.

Although in our own case no positive evidence of cardiac disability occurred until six years prior to the patient's death, it is quite clear from his history that the endocarditis must have existed from a much earlier period. The very fact that from the patient's earliest childhood he had been indisposed to join in the amusements of his playmates, and had always been inclined to remain in quiet and retirement, is significant that there existed some ill-defined self-consciousness upon the part of the patient that he was incapacitated from taking part in the active exercises of others of his own age. When, however, upon being subjected, six years prior to his death, to an occupation not entailing any very laborious exertion, it at once became evident that a serious cardiac disability existed. In this connection it is interesting to call attention again to the fact that the patient presented himself for examination as an applicant for life insurance in March, 1894, and, as already stated, he believed himself to be at the time in good health, not suspecting the serious condition of his heart which the physical examination revealed. He next came under observation during the latter part of June, 1894, when he presented himself for treatment at the Jefferson Hospital. His symptoms then were those of ruptured compensation, and the physical examination revealed, in addition to the murmurs of mitral stenosis and mitral incompetency, a well-marked systolic murmur having its greatest intensity near to the sternal junction of the sixth right costal cartilage. The latter murmur was believed to be dependent upon a relative stretching of the tricuspid orifice, and was held to be secondary to the disease at the mitral orifice; the existence of tricuspid stenosis was not suspected.

A study of the various lesions found in association with tricuspid stenosis reveals the fact that mitral stenosis is the most frequently associated lesion, and occurs in the great majority of the cases. Both Fenwick and Sansom assert, however, that tricuspid stenosis is never met with except in association with mitral stenosis; and, indeed, in all of Fenwick's cases this lesion of the mitral orifice did in reality exist. Nevertheless, in Leudet's collection fourteen cases are cited in which no lesion of the mitral valve coexisted; in eleven of these the tricuspid

valve alone was involved, and in three the tricuspid and pulmonary. So, also, in the fourteen cases that we have collected it will be seen that tricuspid stenosis unassociated with other lesions existed in one case. The above statistics of Leudet include the much-quoted instances of simple tricuspid stenosis reported by Duroziez and Torres Homem. The occurrence of tricuspid stenosis, however, not associated with mitral stenosis must be considered as a pathological curiosity. So striking is this fact that Leudet looks upon the disease at the mitral orifice as being the primary cause, in many instances, of the tricuspid lesion.

Aortic stenosis in association with tricuspid stenosis is stated by Sansom to occur in one-fourth of the cases. A study of the 128 cases shows that this lesion coexisted in twenty-nine of them, being a proportion of nearly 23 per cent., so that the statement of Sansom is about correct. It will further be noticed that no instance is noted in which the aortic disease is not also associated with mitral disease; in other words, tricuspid stenosis is never associated with aortic disease unless there also exists mitral stenosis, a point to which, I believe, attention has not until now been directed.

In such a case as the one the basis of this paper the question naturally arises, which valve system was the first to become diseased? From the drawings it will be noticed that the endocarditis is far more advanced in the left than in the right heart. Although this might be expected to be the case when we take into consideration the fact that the left heart is called upon to do the greater amount of work, and, therefore, would show the greater extent of lesion, a closer study of the lesions will show the existence of a simple adhesive endocarditis in the right heart, while in the left heart, especially upon the mitral valve and about the mitral orifice, even extending a considerable distance upon the inner wall of the auricle, will be seen numerous atheromatous and hard calcareous masses—a condition that is really remarkable considering the age of the patient. This is shown in the drawing illustrative of the mitral valve by the white shadings about the mitral orifice and upon the wall of the auricle. It seems to us, therefore, that the disease began first in the left heart, and that it later extended to the right heart, where it developed more gradually and insidiously as the result of the same cause which at first attacked the left heart, and which no doubt subsequently became repeatedly operative.

The high grade of aortic stenosis is well demonstrated by the drawing illustrating the condition of that valve. Notwithstanding this extreme stenosis its existence was not diagnosticated during life. This failure of diagnosis, as well as the absence of the radial pulse during life, require explanation. The cause of the latter phenomenon becomes evident if we reflect that because of the extreme mitral narrowing the quantity of blood passing into the left ventricle was necessarily very small, and that

the obstruction offered to the passage of this small quantity of blood into the aorta by the greatly-narrowed aortic orifice was sufficient to obliterate completely the limited impulse that would have been imparted to the blood-column had aortic stenosis not existed. The same physical conditions, too, explain the failure to diagnosticate the existence of aortic stenosis; the small amount of blood in the left ventricle, and the difficulty with which it must have been forced through the narrowed aortic orifice, must have resulted in the production of a murmur possessed of such a low degree of intensity as not to admit of its perception.

In conclusion we will say that the diagnosis of tricuspid stenosis during life is rarely made, and in this connection the statement is made by Shattuck that in the eighty-nine cases upon which he bases his article, and which include the seventy cases brought forward by Fenwick, a diagnosis was made during life in less than half a dozen instances. This writer concludes that: "Whether a presystolic tricuspid souffle can be heard or not, tricuspid stenosis can be pretty safely diagnosticated if the patient is a female with rheumatic history, has mitral stenosis, perhaps also aortic disease, and presents the evidences of prolonged or recurrent venous stasis of greater or less degree."

The only particulars in which our case answered to this description were in the doubtful antecedent history of rheumatism and the existence of prolonged and marked cyanosis, a cyanosis which in its degree and persistency was remarkable; and in the light thrown upon the case by subsequent events we cannot but think that this symptom is of extreme significance as pointing to tricuspid stenosis, for in no other cardiac lesion is it found in so marked a degree, so prolonged in duration, and so uninfluenced by treatment.

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REVIEWS.

HISTO-PATHOLOGY OF THE DISEASES OF THE SKIN. By DR. P. G. UNNA, of Hamburg. ["Die Histopathologie der Hautkrankheiten," bearbeitet von Dr. P. G. Unna; mit 1 chromolithographirten Quartafel. Berlin, 1894, pp. 1225. Achte Lieferung der "Lehrbuch der Pathologischen Anatomie," von Dr. Johannes Orth.]

THIS comprehensive, elaborate, and scientific work is worthy of the distinguished German author who has labored so faithfully in the field of the pathology of the skin. It is a remarkable and very valuable production. To review the vast amount of matter that is contained in the volume is a task that is not possible to compass, but we shall endeavor to point out at least the scope of the work, and to enter into the spirit of the author in discussing it. One instinctively feels that the author is not a bookmaker, but that he writes because there is much information to impart.

Perhaps no better introduction to the book can be given than by presenting the outlines upon which the whole structure rests. The pathology of the skin is considered under the following headings:

I. Anomalies of circulation.
II. Inflammations.
III. Progressive disturbances of nutrition.
IV. Regressive disturbances of nutrition.
V. Malformations (misbildungen).
VI. Saprophytes and foreign bodies.

In the first class are grouped anæmias, hyperæmias, angioneuroses, œdemas, and hemorrhages.

In the second class are found traumatic, neurotic, and infectious inflammations.

Class III. Progressive disorders of nutrition, comprises carcinoma, adenoma, fibroma, angioma, and the like, together with certain hypertrophies.

Class IV. embraces degenerative changes, characterized for the most part by atrophies or loss of substance, as ulcers, due to varied causes, as scleroderma and similar diseases.

Class V., malformations, contains nævus and other congenital formations.

Class VI , saprophytes and foreign bodies, is small, including not more than a half dozen unimportant diseases, such, for example, as tinea versicolor, erythrasma and argyria. The subject-matter is hardly worthy of a separate class. In these six classes are embraced all the diseases which are known to involve the skin, by far the greater number being found in that convenient class, inflammations, so serviceable for clinicians as well as for pathologists. Here we note certain diseases

which heretofore have by most authors been regarded as new growths, as, for example, syphilis, lupus vulgaris and lepra, as well as granuloma (mycosis) fungoides, which the author separates from sarcoma. But to point out the numerous changes which are made over formerly-accepted views as to classification and pathology would lead to a consideration of a large part of the book, so great is the revolution which on all sides confronts us. New terms (far too many, we do not hesitate to say) are conspicuous, some of which are tolerably familiar through work to be found in the special journals during the last decade, more especially by the author and his pupils; others are brand new. There is no occasion, it seems to us, for the coining of some of the new terms in this book, adjectives as well as substantives; for example, "spongoides" for sponge-like.

The different diseases are taken up systematically, one after another, according to the classification, a brief clinical description often preceding the pathology, to which latter topic, it need scarcely be stated, all the matter is almost exclusively devoted. Authors and investigators are freely quoted, reference to the literature being given at the close of the chapter, from which lists one may get a good idea of the most important recent contributions to the subject considered. The author is a broad reader, and covers not only strictly dermatological matter, but also the literature of general pathology and bacteriology which may have a direct bearing on the point to be elucidated. This is as it should be, and shows the author to be not only a dermatologist, but also a general observer, who makes the whole field of medicine and surgery contribute to explain the simple and complex states of the skin in disease. This is surely the proper attitude from which to view dermatology. When so regarded the subject ceases to consist merely of a collection of primary and secondary lesions of the skin, to be viewed and located as such, as many authors would have us believe is the sum total of dermatology. The *meaning of these lesions*, after all, is the real substance of dermatology. The causes which produce them, and our ability to modify or remove them, are of much greater importance than their character, form, size, configuration, color, and the like. Symptomatology, *per se*, while of importance, must not be overestimated, for it is elementary and insignificant as compared with pathology. It is on a similar line of thought that Dr. Unna would interpret diseases of the skin in the work before us. Anatomy, pathological anatomy, and general pathology are made by him to throw light on the morbid conditions of the skin we are accustomed to regard as diseases. To say that he has done this in a scientific manner need hardly be stated, for all his work, now so well known to the profession through numerous and important contributions, bears this stamp.

The book contains a vast amount of original and valuable research, a good deal of which is on new lines of thought. Some of the views are distinctly in advance of general recognized knowledge. Whether they will be corroborated by future observers and eventually become established facts in dermatology is a question that time alone can decide. Thus, eczema is regarded as an infectious inflammation. Such a view, of course, is at variance with the teachings of other authors, and cannot be permitted to pass without challenge. Acute vesicular eczema is regarded as inoculable, and is spoken of as "impfeczem." So-called "morococci" or grouped mulberry-like cocci, as well as leucocytes, are de-

scribed as occurring in the vesicles. In this connection the close relation of this form of eczema to impetigo, from a bacteriological standpoint, is dwelt upon.

Chronic eczema is discussed by itself and apart, special stress being laid upon the process of parakeratosis, the epithelial proliferation, and spongy ("spongoide") metamorphosis which takes place in the epithelium. Parakeratosis is the most important symptom of the disease, and is never wanting. It is pathognomonic. The seriously-infiltrated spongy state of the epithelium ("status spongoides" of the author) so common in eczema, especially in eczema rubrum, is described at length, being a very important element in the local pathology of the disease.

Eczema is regarded as the type of the "moist catarrhs" of the skin, and psoriasis as the type of the "dry catarrhs." Pemphigus is placed with the moist serous catarrhs, and not with the "neurotic inflammations," where it seems to us it would have been more properly grouped. To pass on to other chapters, we find lupus vulgaris, scrofuloderma, and tuberculous ulcers considered under tuberculosis, scrofuloderma being looked upon as a "secondary tuberculosis of the skin." This disposition of the scrofulous cutaneous lesions is reasonable.

The pathology of the cutaneous manifestations of the acute exanthemata have received careful study. The degenerative changes which take place in the pock of variola are clearly set forth and are illustrated in a plate. The so-called protozoa of the pock-pustule, as described by Pfeiffer and von Lœff, the author believes to be identical with his "ballonirten epithelien." One of the most interesting chapters is on carcinoma, which is dealt with in a most comprehensive manner from the histological standpoint, the varieties of the disease being made upon an anatomical basis.

The work throughout is so written, *currente calamo*, that it is difficult to bring out succinctly special points, or aphorisms, in connection with any particular disease. The style is quite the opposite to being aphoristic. Condensation of many of the chapters would not have detracted from the value of the matter. The aim of the author has been to describe accurately and closely what actually occurs in the skin and what he and others have observed in the various pathological processes considered. The studies are all recent. The work is fresh, and deals with the latest observations and discoveries. The book is not a text-book; it is, indeed, both in scope and in style, very far removed from and altogether above such works. It is an exhaustive exposition, from the histological standpoint, of the pathology of cutaneous medicine. It is a book to be studied rather than to be read casually. It deals with the subject from a strictly scientific aspect, touching practical matters only where science permits. The author fearlessly treads new ground, and upon which he feels himself secure, supported by the microscope and by abundant observation. One cannot help admiring the bold spirit which has prompted this champion of science for science's sake to venture far beyond the lines of general knowledge. New paths and fields have not only been staked out, but are occupied by him. How lasting this great structure, the labor doubtless of many years, that the author has raised will prove in the years to come no one to-day can foretell. In our opinion it may be safely stated the work has been done conscientiously, with the single aim of setting forth the results obtained by himself and other investigators in the same field. The details of the work done are immeasur-

able. An unknown territory in the pathology of the skin has been cultivated, and, moreover, upon such a comprehensive scale as to dwarf completely all other former attempts by authors in the same direction. Literature has been greatly enriched by the production of this work, which for many years to come will be regarded as authoritative on the histo-pathology of the skin. It stands alone; it is unique.

The chromo-lithographs are few and small, but they are accurate, each one showing clearly some interesting or undescribed point. There are no drawings or wood-cuts. We commend the book heartily to dermatologists, histologists, and pathologists,—to all investigators in special or general pathology, feeling assured that they will find a great deal of matter of intrinsic worth. A full index adds materially to the value of the work. The type and paper are exceptionally good.

L. A. D.

OBSTETRIC SURGERY. By EGBERT H. GRANDIN, M.D., Obstetric Surgeon to the New York Maternity Hospital; Gynecologist to the French Hospital, etc., and GEORGE W. JARMAN, M.D., Obstetric Surgeon to the New York Maternity Hospital; Gynecologist to the Cancer Hospital, etc. Pp. 207, with eighty-five illustrations in the text and fifteen photographic plates. Philadelphia: F. A. Davis Co., 1894.

THIS book not only fills a gap in obstetric literature, but also furnishes a strong plea for modern methods in treatment. The keynote of this volume is election in obstetric surgery; the writers maintain that the excellent results now secured in general surgery are obtainable in obstetrics, if the same principle of election which places the general surgeon at so great an advantage in dealing with many of his cases is adopted by the obstetrician. The book is entirely without padding, and impresses the reader as a candid statement of methods in actual practice with the writers.

An Introduction is appropriately devoted to obstetric asepsis and antisepsis. The writers consider that puerperal sepsis means faulty technique, and that there can be no shifting the responsibility on Nature. In treating of septic infection the writers employ the term "septicize," a word which is a stranger to us. In cleansing the hands the permanganate and oxalic acid method is preferred. In rendering the vagina aseptic the direction is given, and correctly, first to scrub the part thoroughly with soap and water before bichloride of mercury is to be used; although the best of reasons exist for this usage, it is doubtful if it obtains except with those best informed. A stronger solution of bichloride than 1 : 5000 is considered dangerous for douches. In rendering instruments and appliances aseptic the writers condemn strongly metal catheters, and urge that glass catheters and glass irrigating tubes only should be selected. The ideal suture for the ordinary purposes of obstetric surgery is silkworm-gut, which the writers rendered aseptic and pliable by boiling it for ten minutes in 5 per cent. creoline solution.

Pelvimetry is rightly the first procedure treated of in the book. The physician is held not guiltless who neglects pelvimetry, and it is urged

that this may be practised while the surface of the patient's body is covered by a thin and pliable sheet. It is our invariable practice to examine patients in this way, and we have yet to meet with objection from an intelligent person to such an examination. It is urged that digital pelvimetry be practised as a routine measure in every case; we have not found this necessary, and reserve it for cases where an abnormality in the pelvic dimensions, revealed by the use of the pelvimeter, justifies a more radical procedure. The advice that digital examination of the pelvis should be made under anæsthesia in cases of pelvic abnormality is justifiable, as this is the only method affording practical information of value. The attention of the reader is properly drawn to the great importance of the comparative size of the child and pelvis. It is well said that if we could solve as approximately the size of the fœtus as we can the capacity of the pelvis, the surgical side of obstetrics would be much simplified. The general statement is made that if a fœtus can engage at the inlet, it can also engage at the outlet, of the pelvis, unless some abnormality be present, which may be determined by digital pelvimetry. In estimating which deformities of the pelvis are most often met with in the United States, the writers have found the major deformities but rarely, but call attention to the important fact that the determination of highly-deformed pelves is a far simpler matter than that of minor deviations from the normal. In highly-deformed pelves the choice of operative treatment is greatly restricted, while in the slightly deformed pelves a positive choice is often difficult. It is especially essential in the justo-minor pelvis to know the amount of diminution in its diameters, to elect a proper operative treatment. The various types of contracted pelves are clearly described, and the conclusion which the writers draw from this analysis is well urged, namely, the helplessness of the practitioner in the presence of a case of labor at term in an abnormal pelvis of whose shape and dimensions he is ignorant. He may be obliged to choose between the most difficult and unsatisfactory obstetric operations without the requisite time for proper preparation, and with his patient in a greatly-exhausted condition.

The description of artificial abortion is excellent, and great and proper stress is laid upon thorough asepsis and antisepsis in this procedure. We greatly prefer the douche-curette to the blunt loop figured in the book, and to the ovum-forceps. We are much averse to using a complicated intra-uterine catheter as difficult to clean as is the Fritsch-Bozeman. In our hands the douche-curette takes the place of the curette, ovum-forceps, and irrigating-tube described by the writers. The statement that the best of all instruments for removing the ovum is the aseptic finger represents undoubtedly the best judgment of the profession; but the aseptic finger fails in so many cases entirely to remove the ovum that the douche curette may be advantageously employed. Dilatation of the uterus by gauze packing well merits the full description given by the writers and the value which they place upon it as a method of treatment.

The induction of labor receives adequate attention, and we are glad to have the duty of the physician to examine his patient every week, by endeavoring to fit the fœtal head into the pelvis, so clearly and forcibly described. In describing the methods for the induction of labor, the writers lay proper stress upon preserving the membranes intact to protect the child. The value of the gauze strip as a vaginal tampon is well

emphasized under this head. In inserting the bougie we have not found it necessary to employ the speculum, steel dilator, and tenaculum which the writers advise. By selecting a medium-sized bougie, and, under thorough antiseptic precautions, guiding it gently into the cervix, we have been able to introduce it with no other instruments than the fingers. Where the patient is nervous and frightened, partial anæsthesia with chloroform, or bromide of ethyl, has been necessary in our experience.

Rapid dilatation with the hand, the so-called *accouchement forcé*, has ardent champions in the writers of this book. We have no doubt of its value when performed with skill and patience; we should also add, under chloroform, and very possibly this anæsthetic would be preferred by the writers for such use, although it is not mentioned.

The incubator devised by Marx, of New York, does not impress us, from its illustrations, as being as inexpensive and portable as is stated by the book. We use a very simple incubator resembling that employed by Auvard, in which heat is supplied by cans filled with hot water. If one can be refilled at intervals of an hour and a half, a temperature of 86° or 88° F. is readily obtained.

In treating of forceps the teaching of the writers represents fairly the best usage of experienced obstetricians. There is no question that many things can be done with forceps, but it is also true that the legitimate range of this instrument is a strictly limited one, and that many forceps applications designed to produce rotation, or to expedite labor, may be well replaced by putting the patient in suitable postures, and by the practice of abdominal manipulation and administration of stimulants. The writers justly condemn any use of the forceps except as a simple tractor. They call proper attention to a safe rule for application when the conditions are favorable, namely, that whenever the head fails to recede after a contraction of the uterus, but remains stationary, the forceps should be applied. As we expected, especial stress is laid upon the folly of forceps application unless the practitioner knows the comparative size of the pelvis and the fœtus. In speaking of the dilatability of the *os uteri* we think that the authors are incorrectly stated by a misprint: on page 76 a statement is made that "Carcinoma of the cervix, inasmuch as the cervix is rendered so pliable, is a contra-indication of the application of forceps." In selecting the anæsthetic for the application of forceps our experience has not coincided with that of the writers, for we prefer ether to chloroform in most cases. Looking at the forceps as a supplement only to labor-pains, we select that anæsthetic which most tends to induce uterine contractions. The importance of introducing, if necessary, the entire hand to make a positive diagnosis of the position of the head and to guide the forceps safely is well stated by the writers. The classification of applications made in this book into "low," "medium," and "high," is not borne out in our experience. If the pelvis and the fœtus are proportionate in size, we have been able to discover but two positions of the head in which the forceps is indicated: most frequently the head is found descended to very near, or upon, the pelvic floor, but without rotation; less commonly the head remains just within the brim of the pelvis or firmly engaged within the pelvic brim. When the head is movable above the pelvic brim the forceps is not indicated, in our experience, but symphysiotomy and the forceps, or version, should the form of pelvis be favorable, under chloroform anæsthesia, would be our choice.

The treatment of version in this book is excellent. Here again we call attention to the value of chloroform in contrast to ether in facilitating the operation. We are glad to note that the writers have found that, practically, that foot should be brought down first which can be soonest recognized and most firmly grasped. We have seen inexperienced operators considerably embarrassed and delayed while performing version by the effort to recall lecture-room directions as to the foot which should be brought down in a given case. The writers bring out very clearly a position which they have advocated for some time, namely, that in failure of rotation, the occiput presenting, but remaining persistently behind, it is often better to secure full dilatation of the cervix with the hand, and promptly to perform version. Our personal experience leads us to believe that this view is undoubtedly correct, and we wish that the excellent presentation of this point made in the book might be taught to every student of obstetrics before he attempts to deliver a case of posterior rotation of the occiput by forceps. As the writers state, their course of action herein advocated is not novel, nor is it as radical as at first sight it may appear. It has long been the custom in several of the Continental clinics to remedy defective rotation of the occiput by the introduction of the entire hand under chloroform anæsthesia, and even to terminate labor by version and extraction. The fact that thorough surgical antisepsis was tardily applied in American maternities and the prejudices existing in some quarters against the use of chloroform for version have done much to fortify the teaching that the forceps is the instrument to be used in these cases.

We have been much interested in the writers' presentation of symphysiotomy, and find that our experience coincides in the main with theirs. We have not observed, however, the bulging of the peritoneum and of the bladder into the opening at the joint, which is described by the writers. In performing the operation we have made it entirely a subcutaneous one, and with the exception of one case, which required the use of the saw, we have employed the Galbiati knife in its original form. The point made by the writers that the use of the Galbiati knife may do violence to the tissues about the urethra, favoring cystocele, we believe to be a good one. Cases under our observation, in which symphysiotomy was performed about a year ago, show perfectly satisfactory conditions so far as the pelvis is concerned. The only disability from which these patients complain is cystocele and retrocele of very moderate extent. As the patients are working-women who have been obliged to work hard from the time of leaving hospital care, it is quite possible that this complication would not have occurred had the patients not been obliged to undergo severe exertion. The stout, blunt-pointed bistoury, where its use is possible, certainly opens the joint with the least violence to the adjacent tissues. We desire to urge the importance of electing symphysiotomy, in place of performing the operation after a fruitless trial with the forceps. This view is in strict accord with that of the writers, but we should urge it more strongly even than do they. The results of symphysiotomy performed before the application of forcepe are so satisfactory for mother and child that we think this point worthy of emphasis.

In treating of Cæsarean section, the writers give an excellent presentation of the subject. They wisely lay stress upon the details of the operation, and anyone who has performed the operation will realize

that if everything is properly done there is no smoother operation in surgery. We differ with the writers in advising the removal of the abdominal sutures on the tenth day; if silkworm-gut be used, the sutures are not irritating, and it occasionally happens that a patient recovering from Cæsarean section coughs or vomits, when a partial separation of the wound has occurred.

The writers carry the doctrine of election consistently through the book, and urge that embryotomy should be considered as indicated by due election. It is held that, in private practice, the question still remains open to the choice of the patient, while in maternity hospitals, in the hands of experts, the choice of the patient is less binding upon the operator. The prognosis of embryotomy is found to be more grave in private than in hospital practice. The reason for this is found in the fact that in private cases the attending physician will try every other expedient before having recourse to the destruction of the fœtus. Pelvic measurements are also less commonly taken among private cases, and thus the attendant is unwittingly brought into a position of great difficulty.

Under the head of the "Surgery of the Puerperium," immediate suture of the torn cervix is described, and the writers state that before long it will be recognized as desirable to close a torn cervix immediately after labor, as it now is to repair immediately a torn perineum. The description of immediate perineorrhaphy is excellent; the repair of fistulæ is also described, and rupture of the uterus receives adequate treatment.

In treating of obstetric surgery as applied to the management of sepsis, the writers properly begin by pointing out the fallacy of repeated intra-uterine douching; they prefer, in cleansing the uterus, a sharp curette and irrigating with bichloride of mercury, 1 : 8000, followed by a pint of peroxide of hydrogen. We much prefer the blunt-edged douche-curette, using any one of the carbolic group of antiseptics. Our reasons for this choice are based upon the pathology of septic endometritis, it being our belief that the purpose of the curette and douche is simply to remove necrotic tissue, and not to invade the protecting area of granulation cells which hinder the access of septic matter to the blood and lymphatic circulation of the uterus. It is not our experience after curetting to observe that the patient has a chill, as described by the writers, and it occurs to us that possibly this chill is caused by fresh absorption of septic matter through channels opened by the curette.

We are heartily in accord with the teaching of the writers as regards the treatment of septic infection of the body of the uterus, the tubes and ovaries, and peritoneum. We have held for some time that unless marked improvement follow douching and curetting, with saline purgation, in forty-eight hours from the time in which the curetting is done, that the duty of the obstetrician is to perform cœliotomy, prepared to deal with whatever intra-abdominal complication may present. In dealing with ectopic gestation, we notice their reserve in stating that the arrest of the growth of the ovum by electricity is justifiable. No one can fail to agree with them in this, although they wisely abstain from stating their belief that the growth of the ovum *can* be checked by electricity. We are quite sure that, in their hands, no time would be wasted with trials of electricity. In dealing with abdominal gestation the writers express a very gloomy view of the chances for delivering a living child

by cœliotomy. The records of operation for this condition, it seems to us, afford ground for a more hopeful view in the interests of the child, and we fail to understand why incision and removal of the child and leaving the placenta is any more dangerous than incision and removal of a dead child, the placenta remaining to be discharged piecemeal in each case. The dangers of delay to await the death of the child are considerable, and from our knowledge of such cases we should much prefer to operate with the endeavor of securing a living child.

In concluding our review of this book we feel that the writers have placed us under obligation for presenting in clear and forcible language an accurate statement of personal experience. They establish what we take to be their point, namely, that the honest practice of obstetrics requires surgical skill and the same study and care which the successful surgeon gives to other patients; that anything less than this is justifiable obstetric practice the writers do not believe. The influence of this book should be for good, in counteracting a vicious opinion in the minds of the profession and laity, namely, that because labor in a physiologically perfect mother and fœtus, under physiologically perfect conditions, is a physiological process, that therefore labor, as observed in all classes of patients, is a physiological process. This error, an inheritance from the era of obstetric teaching which denied the contagious nature of puerperal fever, has resulted in cheapening obstetrics as a branch of medicine, by assigning labor cases to midwives and students, and by educating the laity to believe that partially educated medical persons are competent to deal with labor cases. While we differ with the experience of the writers of this book in some respects, we have nothing but commendation for their valuable contribution to obstetric literature. It has given us profit to learn from them, and it will be our pleasure to place their book in the hands of others. E. P. D.

New York Eye and Ear Infirmary Reports. Vol. I., Part I., January, 1893; Vol. II., Part I., January, 1894. Edited by John E. Weeks, M.D., Pathologist to the Infirmary. Large 8vos., pp. 111 and 104. New York: G. P. Putnam's Sons.

Ophthalmic medicine is to be congratulated upon the appearance in conjoined form of the most important of the great and valuable work of this well-known institution. This, the first attempt of its kind in this part of the world, has been most successful. The first volume opens with a report by Dr. Callan upon the clinical histories of nine cases of orbital traumatism resulting in immediate monocular blindness through fracture into the foramen opticum. He states that immediately after the accident the patient is either stunned or becomes dizzy, and may suffer from shock. There is bleeding from the nostrils, the mouth, and the ears. In a little while, the patient discovers that one eye is blind. Examination shows palpebral œdema, followed in a few days by discoloration of the lids. The eye itself is generally diverged and protruded. The conjunctiva is ecchymosed. The pupil is large and the iris remains irresponsive to light stimulus. At first the ophthalmoscopic appearances are negative, but within two weeks the utmost pallor of the optic disk becomes noticeable.

The writer's explanation of the reason why such fracture involves the

optic foramen is as follows: As the frontal bone unites with the nasal, superior maxillary, lachrymal, and ethmoid bones by a continuous line of sutures until the lesser wing of the sphenoid bone is reached, and as at this point the suture line bifurcates, forming an obtuse angle, and as the optic foramen is quite near the apex of this angle, the jar made by a blow would find its weak point along this line of sutures, and the first resistance would be at the bifurcation that is adjacent to the optic foramen. Consequently, as the movement or jar could not follow both lines with equal force at and beyond the bifurcation, the unequal strain would result in fracture of the bone into the optic foramen, producing compression of the optic nerve and sudden loss of vision in the eye.

Gruening follows by a careful clinical history of a case of affection of the cervical sympathetic nerve with oculo-pupillary symptoms and anidrosis, in which, as in Nieden's classical case, the pathological paradox of the coexistence of paralysis and irritation in one and the same nerve presents itself. He does not offer any new light upon the obscure pathology of the sympathetic by his contribution, but believes that the salient point is, that simple exposure to changes of temperature may produce a permanent affection of the cervical sympathetic in which the vascular symptoms in the onset are those of constriction and not of dilatation. In this case, as in Niedin's, there was no alteration in the accommodative function.

Based upon a successful operation by means of Wolfe's flaps for the restoration of the integument of the eyelids in a case of severe burn, and a critical study of thirty-seven cases where the same procedure was employed, the editor arrives at the following important conclusions:

1. The transplantation of a flap without a pedicle is not so certain to be successful as the transplantation of a flap with a pedicle. The former should be done only when the latter is not possible.

2. The flap should be free from subcutaneous tissue, and should be kept at the temperature of the body as nearly as possible during the process of removal. It should be placed in position as quickly as possible.

3. Strict antisepsis or asepsis should be employed throughout the entire procedure.

4. No sutures should be employed for securing the flap if they can be dispensed with. They add an element of danger.

5. The flap may be inspected with safety after forty-eight hours. If there is no contra-indication, it should not be disturbed for four or five days.

6. The attachments to the cheek or of the margins of the lids to each other should not be severed until the flap has become firm.

In a practical paper upon "Operative Measures for the Relief of Chronic Suppurative and Non-suppurative Inflammation of the Tympanum; the Indications for the Employment of Such Measures and the Results Obtained," Dench comes to the conclusion that there can be no question that surgical procedures upon the middle ear enable us to benefit a large number of patients who would otherwise be unrelieved. He believes that operative interference in this region must take the same position as in any other; and thinks that it must not be adopted to the exclusion of all other plans of treatment, nor must it be resorted to in every case in which milder methods have failed to afford relief. He says that care in the selection of cases, restricting surgical procedures to those only in which a thorough study by all means in our power indicates that ope-

rative treatment will be beneficial, cannot fail to give operative otology a prominent place in the special surgery of to-day.

Other papers and communications of very great interest have been written by Adams, Alderton, Bacon, Cocks, Dench, Essen, Hewitt, Mayer, Skeel, and Weeks.

Upon careful reading, the second volume proves itself even of greater interest than the first. Noyes gives some very important clinical contributions upon a series of plastic operations on the skin which were made for the correction of various deformities. He also puts on record a case of capsular cataract and foreign body in the retina for sixteen years, which is remarkable in the fact that calcareous degeneration of the lens and the presence of a foreign body upon the retina were not sufficient causes for irritation, while the calcareous fragments of the lens floating in the vitreous, impinging upon the interior of the eye, were amply sufficient to create serious disturbance. A brief recital of a case of spontaneous disappearance of cataractous opacity, and the notes of a temporary attack of keratitis following the extraction of a hypermature cataract are also given by the same author. The last case is noteworthy in the fact that immediately following the delivery of the lens a four per cent. solution of boric acid was unintentionally injected into the anterior chamber of the eye; this, according to the author, being the cause of the production of the corneal reaction. He strongly urges that we should not use irrigating fluids stronger than one per cent. of boric acid, or, still better, the $\frac{7}{10}$ per cent. solution of chloride of sodium, the fluid being blood-warm and sterilized.

Derby's cases of affection of the eye, apparently dependent upon uterine derangement, are given in the highly commendatory spirit to stimulate others, either in gynecological or ophthalmic practice, to make public their observation in this direction. His clinical history, with the microscopical study by Weeks, of a case of cylindroma of the face, is of great interest.

Papers by Friedenberg, upon the pathology of sarcoma of the choroid; by Asch, upon endothelium of the tonsil; by Dench, upon affections of the sound-perceiving apparatus; by Weeks, upon a most interesting case of sympathetic ophthalmia occurring forty-two years after the loss of the exciting eye, followed by recovery, with useful vision, are all very important, and show how varied the work has been.

Valuable contributions by Callan, Dennett, Skeel, Lambert, Marple, Bacon, Roberts, and Noyes upon various affections connected with the eye, throat, nose, and ear, and the description of useful and improved modifications of different apparatuses, with a summary of the year's work done at the Infirmary, conclude the second volume.

Such work as this, brought together in its present collective form, offers both the general reader and the scientific expert an opportunity of seeing this representative work of the members of the staff of the Infirmary in a combined manner, instead of compelling the reader either to search haphazardly in a desultory way through various, and in many cases only locally-known, medical journals. Moreover, as shown by the results of the same character of publications in both the general and special hospitals of the old world, the staff both individually and as a unit become better known, and the Institution is able to show more plainly the real amount of work done within its walls. We earnestly hope that these two volumes may be the beginning of a long series of constantly bettering and increasingly valuable reports. C. A. O.

PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

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The Treatment of Empyema in Tuberculous Patients.

Dr. Ch. Bäumler concludes a very interesting clinical study with the following statements: 1. Under all conditions a radical operation should be done—the best is a thoracotomy with resection of ribs—if the exploratory puncture shows the presence of the bacteria of suppuration in the exudation. 2. If the exudation contains no bacteria of suppuration, but perhaps few tubercle bacilli, or indeed no bacteria of any kind, aspiration may be employed, which will relieve pressure, and will allow the lung to expand if it be expansible. 3. If the case is one of long standing, the compressed lung inexpansible, the condition of the patient passable or good, the empyema stationary, palliative measures are more in the interest of the patient. Of these measures the Playfair-Bülau method of slow aspiration-drainage is the least severe.—*Deutsche medicinische Wochenschrift*, 1894, Nos. 37, S. 717; 38, S. 738.

How to Treat a Diabetic attacked with Albuminuria.

Dr. Henri Huchard divides this subject into three parts: 1. If there is an albuminuria of nervous or dyscrasic origin, not dependent upon any renal lesion, which is slight, transitory, alterative or substitutive, associated most frequently with slight diabetes, this is a hybrid condition, a glyco-albuminuria. It is quite likely to be of dyscrasic origin, produced by a functional trouble having its principal seat at the floor of the fourth ventricle. The indications are the nervines (bromide, zinc phosphide, antipyrin), revulsives to the neck, or methyl-chloride. As for the albuminuria, it is to be ignored. 2. If the albuminuria is of renal origin, it is a parenchymatous nephritis and consecutive to the diabetes, and there are two diseases developing side by side. In most cases it is the renal disease which is threatening, and it is necessary to make use of a milk diet. Here, as in all renal disease, it is necessary

to consider the heart, and large doses of digitalis may be needed. 3. Diabetics often suffer from arterio-sclerosis, and under this head can be placed interstitial nephritis, better called arterial nephritis. Here again the danger lies in the kidney, and it is the heart which must be sustained and fortified at a given moment. In this case do not hesitate to prescribe a milk diet, and later digitalis; voyages, and especially long railway journeys, should be forbidden. For the cases in which albuminuria complicates diabetes the patient should visit Vichy or Carlsbad; but these waters are absolutely contra-indicated when the diabetes is complicated by an interstitial or by a parenchymatous nephritis. Here the diuretic waters, Contréxeville, Vittel, or, better, Evian, should be used. But the benefit which the patients may derive does not always compensate for the dangers to which they are always exposed upon the long railway journeys.—*Journal des Practiciens*, 1894, 2e. sémestre, No. 33, p. 386.

Ergotism.

Dr. P. Chatin reports a single case in which the phenomena of ergotism were consecutive to the hypodermatic use of ergotin in the treatment of a uterine fibroma which was cured. The daily amount of ergotine of Lamonte which corresponded to fifteen grains of ergot was used. The symptoms were cramps in limbs, especially at night, permanent numbness in the extremities of the fingers, which was painful and accompanied by painful tinglings, the face and extremities were congested, but of a livid tint. There was also an active sense of præcordial anguish, and a retro-sternal pain extending to the left shoulder and along the left arm to the hand; the heart-beats were regular, the impulse strong, the pulse presented a distinct tension. Some of these symptoms may have been due to the mitral stenosis from which the patient suffered, and to the dry pericarditis which co-existed in this case. Six months later the tumor was only found with difficulty, and the phenomena of ergotism had not left even a trace.—*Bulletin Général de Thérapeutique*, 1894, 40e. liv. p. 360.

Borism.

Dr. Ch. Féré presents an interesting study of the accidents which may occur during treatment by borax. During the six years of experiment, commencing with a daily dose of forty-five grains and increasing it until five drachms are administered, it has been determined that in a considerable number of individuals the tolerance is very great. Gowers has noted diarrhœa, nausea, and vomiting excited by small doses; eruptions of psoriasis may be produced. Eczema has not been observed with the small doses of forty-five grains. The gastric symptoms may be so severe that an actual intolerance results. Sometimes they may be suppressed by the administration of the remedy in glycerin, or by the use of intestinal antiseptics, which also have the advantage of acting upon the cutaneous eruptions. The drug causes a dryness of the skin and mucous membranes, a dryness and a falling out of the hair, the nails present striations. Of the especial forms of eruption, a seborrhœaic eczema of considerable variety, or an acne, or an eruption resembling measles or scarlatina, or a papular one, more or less itching, is

common. The boric cachexia is often seen as a waxy tint of the complexion, with discoloration of the mucous membranes. Furuncular eruptions are often noticed. Besides these manifestations others of more serious import are observed. Œdema of the eyelids, of the face, and of the extremities is noticed, and albumin is found in the urine. Borism gives rise to accidents which are quite as grave as those of bromism, with the difference that those arising in the kidneys are more insidious and more difficult to remove. The inefficacy of the suppression of the drug for the relief of these conditions is explained by the slowness of its elimination. When the fact is taken into consideration that marked success as the result of its administration is exceptional, and when it is useful it produces hardly more than temporary alleviation, and when, as has been shown above, it may produce not only inconvenient but also grave and even fatal accidents, there seems to be but little reason for its employment in epilepsy.—*La Semaine Médicale*, 1894, No. 62, p. 497.

Poisoning by Exalgine.

M. Weber reports an instance where half an ounce of this remedy in three ounces of water had been swallowed. One and one-quarter hours after there were restlessness, rotatory vertigo, blunted sensibility, contractures, and threatening asphyxia. Then followed convulsive crises with cyanosis. Anuria persisted for twenty-four hours, then emission of urine containing hæmatin, biliary pigment, and albumin. Improvement commenced, but there were observed slight delirium and anorexia, with slight jaundice and subconjunctival ecchymosis. The treatment consisted of injections of caffeine, electrization of the phrenic, administration of an emeto-cathartic, and bloodletting.—*Journal des Practiciens*, 1894, 2e. sémestre, No. 34, p. 416.

A New Treatment for Tuberculosis.

Dr. A. Mayor reviews the work of Viqueret. Recognizing the fact that the ass, as well as the mule, has been demonstrated by Chaveau to be completely refractory to tuberculosis, the serum obtained forty-five days after an intravenous injection of bacilli is made use of. This intravenous injection in the ass, it is true, gives rise to a miliary tuberculosis, but caseation does not result, and the animal recovers, the only abnormal manifestation being the development of an extraordinary appetite. Thus far the serum is useful only against tuberculous infection, and not against the microbes of suppuration. It is hoped, however, during the coming year, to obtain such a serum, and with an injection of the confined serums tuberculosis with suppuration may be successfully treated.—*La Médecine Maserve*, 1894, No. 84, p. 1301.

The Treatment of Diphtheria by Antitoxin.

Dr. Charon reports thirteen cases, nine treated by Roux's, the remainder by Behring's antitoxin. Of these cases four died (two after tracheotomy), and of the nine cases which recovered, seven underwent the operation of tracheotomy. The temperature charts show a striking resemblance; in almost all cases the defervescence was by lysis. In case of the complication of broncho-pneumonia the type of descending oscillations was interrupted by a

rapid rise, even to 104° F. In all cases excepting two the Loeffler bacillus was found, the failures being undoubtedly due to faulty inoculation. In these cases the injections appeared to be absolutely harmless when thorough antiseptic precautions have been observed. In the cases where tracheotomy was performed it was possible to remove the canula on the third or fourth day, the false membranes in the pharynx disappearing more rapidly than those in the larynx and trachea; the tracheal wound is not complicated by diphtheria, but it is covered in about eight days with a dry scab, under which the skin is restored. A fact which should be borne in mind with reference to the cases which need operative interference is that the rapid breaking up of the membranes is accompanied by an abundance of purulent mucus, which would be more readily expelled through the tracheotomy canula-tube than through the O'Dwyer tube. Since the broncho-pneumonia is the most frequent fatal complication the older forms of treatment cannot be abandoned. This requires tonics, alcohol, antipyretics, a moist, warm, and microbicidal atmosphere, because the antitoxin acts only against the toxin secreted by the Loeffler bacillus, and not against that of the streptococci and staphylococci associated with it.—*Journal de Mêdecine, de Chirurgie et de Pharmacologie*, 1894, Fasc. 4, p. 337.

Dr. A. McGregor reports a single case of diphtheria complicating measles. A woman, of twenty-five years of age, seven days after the appearance of a copious rash of measles complained of sore-throat and headache. On the right tonsil was seen a small yellowish-gray patch, with a few smaller spots palate and to the opposite tonsil, and glandular swelling appeared in the neck. about it. During the two days following, the patch extended to the soft Microscopic examination and a cultivation proved the case to be one of true diphtheria. Sixteen minims of antitoxin were injected into the muscles of the back. During the next five days improvement continued, and convalescence was established.—*Lancet*, 1894, No. 3717, p. 1215.

Tetanus Treated by Tizzoni's Antitoxin.

Dr. B. Bauer reports a fatal case which was seen eight days after the injury, and which was two days under observation. The symptoms of tetanus did not appear until the day before the treatment was commenced. Besides the antitoxin, the patient received sixty grains of chloral. In the cases previously reported the chronicity of the disease was marked, while in this the short period of incubation and the rapid progress of the symptoms are in contrast. Whether the former series of cases would have recovered under treatment by the usual narcotics is an open question.—*Wiener klinische Wochenschrift*, 1894, No. 45, S. 846.

The Treatment of Severe Stridulous Laryngitis in Infants.

Dr. Henri Huchard states that this condition is based upon two elements, an inflammation and a spasm of the larynx. It is not the inflammation, which can be slight or intense without increasing the gravity of the case, but it is the spasm which constitutes the danger. The emetics, compresses of very hot water (Graves), sinapisms to the lower limbs, internal

administration of ether, are all untrustworthy and inefficient. The remedy is potassium bromide, which must be used in large doses (for a child of four and one half years, sixty to seventy grains per day). The surgical treatment is either intubation or tracheotomy.—*Journal des Practiciens*, 1894, 2d *Semestre*, No. 38, p. 465.

The Hydropathic Treatment of Pneumonia.

Dr. Rendu reports two successful cases. In the first he prescribed the wet sheet and kermes mineral (sulphurated antimony) in julep. The diagnosis was a lobar broncho-pneumonia of irregular evolution, suggesting the grippal variety. Every two or three days there were recrudescences of a type analogous to that of intermittent fever. Each time that the wet sheet was applied there was relief. Although this procedure did not modify either the evolution of the disease nor jugulate it, it certainly contributed to the cure by diminishing the dyspnœa and hyperpyrexia, and by relieving the functional troubles of the kidney. In the second case, alcohol with tincture of digitalis was used. The wet sheet was ordered, and upon the following day, since all symptoms were aggravated and delirium was marked, three cold baths were administered, and upon the next day two baths were given. In pneumonia, cold baths constitute a therapeutic measure of the first order, truly heroic. Their use is, in reality, a return to the first ages of medicine, for Hippocrates has shown their good effects in pneumonia, and has established the fact that they diminish the stitch-pains in the side, facilitate expectoration, and are diuretic.—*Journal des Practiciens*, 1894, 2d *Semestre*, No. 37, p. 449.

The Treatment of Pyrexia.

Dr. W. Hale White believes that hyperpyrexia should be energetically treated by cold baths. In ordinary pyrexia the routine use of antipyretics is not good practice. When benefit coincides with the reduction of temperature the means employed have a specific beneficial effect upon the particular disease; consequently the temperature falls at the same time as the other symptoms improve. In this sense mercury, in syphilitic fever, is antipyretic. Antipyrin, acetanilid, and phenacetin should rarely be used as antipyretics.

Dr. James A. Lindsay stated that external cold was the only efficacious agent in hyperpyrexia, either as cold bath or as cold infusion. In typhoid fever he had found no permanent benefit from the use of antipyrin, acetanilid, or phenacetin. An occasional large dose of quinine (twenty or more grains) given six or eight hours before the upward rise, was often beneficial. The treatment of phthisical pyrexia was very discouraging; the slighter degrees were often here left alone or treated by dieting, fresh air, and rest; the severer degrees were often uncontrollable.

Dr. James Barr finds that an enormous amount of latent heat can be insensibly removed from the body through the exhalation of watery vapor. A properly made and properly applied warm flaxseed poultice becomes a valuable antipyretic measure. It should be free from oil, very moist, and allowed to evaporate freely from its external surface. In this way it tends to cool rapidly, as it quickly absorbs heat which is brought to the surface

through the dilated capillaries, and insensibly transferred to the atmosphere in vapor. Heat can also be abstracted from the body by radiation. Some tins made with parallel surfaces in segments of a circle, filled with ice and then stoppered, were placed about the patient so that he was almost completely surrounded, although he did not come in contact with them. As radiant heat does not affect the media through which it travels, the patient was not rendered very uncomfortable so long as the air was kept still. Water is the great physical agent for reducing temperature. In moderately severe cases cold compresses or wet packs may be sufficient. In hyperpyrexia cold baths or cold douches not merely abstract heat, but rouse up the nervous system. The effect of the application depends not so much upon the temperature of the water as upon the suddenness and momentariness of the application. These cases are best treated by playing upon them with water out of a hose pipe. In other severe cases of pyrexia with prolonged high temperature, and especially in cases of typhoid fever, constant immersions in water at a temperature varying from 90° to 98° F. are satisfactory.

Dr. R. Douglas Powell states that many remedies of the thermolytic class—antipyrin, phenacetin—while valuable in reducing excessive temperature, require careful handling, for if the temperature be reduced considerably below that normal to the disease the danger of relapse of microbic activity is greatly increased. Remedies of the quinine and salicin class, on the other hand, were antipyretics by being germicides and antitoxins. These two remedies were often advantageously combined.

Dr. R. Shingleton Smith admits the utility and safety of the bath, but the introduction of modern antipyretic drugs has removed the necessity of adopting the cold-bath method in all cases of typhoid and other fevers. He had never seen any harm from the efficient, but not excessive, use of phenacetin, and at this time he rarely found it necessary to adopt the cold-bath method, because the temperature was controlled by simpler and less disagreeable methods.

Dr. E. Markham Skerritt believes that quinine is still one of the best and safest of antipyretics, when given in doses, for an adult, of from thirty to forty grains, either in one or in two doses at a half-hour interval.

Dr. Thomas Grainger Stewart did not adopt the cold-bath method as an habitual practice, but trusted rather to cold sponging, iced cloths to the abdomen, and the continuous use of antipyretics, reserving cold bathing only when remedies of easier application failed.

Dr. Herbert Snow called attention to the antipyretic virtues of calomel, purifying the *primæ viæ* and being partly converted into corrosive mercuric chloride, so hostile to microbes.—*British Medical Journal*, 1894, No. 1768, p. 1093.

The Treatment of Purulent Pleurisy.

Dr. C. G. Cumston believes that in recent favorable cases, devoid of all complications, all methods such as aspiration, incision, or resection, may bring about a cure. For cases which are incurable by the so-called classical methods, the siphon of Revilliod offers the prospect of cure. The siphon consists of a tube of black rubber, which is inserted into the pleural cavity;

two feet from the proximal end is placed a bulb, and distally, the tube, being continued for three feet, its termination is placed in a receptacle containing an antiseptic solution—either carbolic acid or creolin—so as to prevent the entrance of air. The proximal end is retained in position with plaster. If there is no fistula, an incision is made near the posterior axillary line, that is, near the anterior border of the great dorsal muscle, whose fibres can be cut without inconvenience in the seventh or eighth intercostal space on the right, and in the eighth or ninth intercostal space on the left side. The advantages of this method are that there is no immobilization of the lung with retention of gas and liquid, but immediate expansion, and the washing out of the cavity is less necessary. In a word, the siphon cures without resection of the ribs and without fistula. Six cases are reported of either chronic or complicated pleurises which would have been considered as incurable, all of which ended in recovery.—*Boston Medical and Surgical Journal*, 1894, vol. cxxxi., p. 502.

The Treatment of Chronic Heart Disease.

Dr. Robert H. Babcock reports nineteen cases which were treated by the Schott method of baths of from 93° to 87° F., containing free carbon dioxide and the salts of sodium and calcium chloride, and by gymnastics. There is no doubt that this method may be dangerous in degenerative changes of the bloodvessels and of the myocardium, such as aneurism and advanced arterio-sclerosis, acute softening, and great fatty degeneration of the heart, when rupture may result from heightened intra-vascular and intra-cardiac pressure. Chronic interstitial nephritis is not a contra-indication. In hypertrophied hearts the baths should not be given as long as the heart is adequate to the peripheral resistance to be overcome, but only when the cardiac energy is threatening to fail or has actually failed. The gymnastic exercises (movements of flexion, extension, and rotation of the extremities and trunk, performed slowly and steadily, interrupted by periods of repose, and against the counter-resistance of a trained attendant) are an important adjunct to the baths. The effort exerted by the patient is not so great as to cause embarrassment of respiration, or undue acceleration of the pulse. If the exercises are properly performed, and the resistance judiciously apportioned to the patient's endurance, these gymnastics slow the rate and augment the force and volume of the pulse, as has been repeatedly shown by the sphygmograph and sphygmomanometer. If too great resistance be applied, there is produced a sensation of cardiac distention with variable degree of dyspnœa, while the pulse grows more rapid and feeble. Improved arterial circulation is so manifest a result of these exercises that it has been known to lessen the frequency and even the severity of the attacks of angina pectoris in individuals who, on account of arterio-sclerosis, had been unable to indulge in even very moderate physical exercise.—*New York Medical Journal*, 1894, No. 836, p. 705.

The Resuscitation of Stillborn Infants.

Dr. Bedford Brown, during the past three or four years, in several cases of this kind, apparently under the most hopeless circumstances, when all

other standard methods had failed, has resorted to hypodermatic injections of brandy or whisky with the most satisfactory results. The amount used is five or six drops in first one arm and then in the other, fifteen drops being the largest quantity used in a single case. If the mother has suffered alarming ante-partum hemorrhage, and the infant has been drained of blood before its birth, this method can avail nothing.—*Therapeutic Gazette*, 1894, No. 11, p. 730.

The Treatment of Tuberculous Meningitis.

Dr. R. Hirschberg reports a single case which was successfully treated by trephining and drainage of the sub-arachnoid space. The effect of the operation was remarkable, the headache ceased, the pulse became more rapid, the commencing coma disappeared, as well as the vomiting.—*Bulletin Général de Thérapeutique*, 1894, 42d liv., p. 411.

The Treatment of Diabetes Mellitus.

Dr. Arthur Clarence Jacobson states that codeine and arsenic have long been the sheet-anchors in this disease. The former should be boldly pushed—one to five grains three times daily, which apparently exercises an influence over the central nerve-changes, thus being curative as well as palliative, but is to be avoided in those cases which are controllable by diet. It may check the waste. Arsenic is used as Clemen's solution of bromine arsenite, in doses of four drops three times daily. In the case reported no results were obtained from these drugs. He does not believe that arsenic exercises any influence over the disease, but that it is useful as an adjuvant tonic. Carbolic acid is an effective antidote to the troublesome itching of the skin. The excessive thirst may be allayed by the use of acidulated or alkaline waters.—*Brooklyn Medical Journal*, 1894, No. 12, p. 735.

The Treatment of Gonorrhœa.

Dr. H. M. Christian has used corrosive mercuric chloride, silver nitrate, potassium permanganate, and trikresol for daily irrigation of the urethra. The amount of warm, not hot, liquid used was one quart, the reservoir being at a height of six feet, the patient standing. The duration of the treatment was two, exceptionally three weeks. He concludes: 1. That irrigation is a distinct advance in treatment; to a certain point it must be considered the proper treatment. It relieves *ardor urinæ* and chordee more promptly, and is attended with a much smaller proportion of complications, as total urethritis and epididymitis. 2. That potassium permanganate, in proportion of 1 : 4000, increasing in the second week to double this strength, is the best remedy. 3. That irrigation of the urethra alone cannot be relied upon absolutely to cure specific urethritis. For the cure of the thin muco-purulent discharge which appears at the meatus in the morning some astringent injection is necessary. 4. That simple non-infectious urethritis can be cured in from ten to twelve days by daily irrigations with potassium permanganate.—*Therapeutic Gazette*, 1894, No. 11, p. 723.

MEDICINE.

UNDER THE CHARGE OF

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THE RÔLE OF STAPHYLOCOCCI IN THE ETIOLOGY OF ACUTE ARTICULAR RHEUMATISM.

SACAZE (*Archives Générales de Médecine*, November, 1894, p. 513) contends that it is often possible in the course of acute articular rheumatism to discover an infective lesion that has preceded for some time the appearance of the pain and other articular manifestations. Such a lesion may be conceived to form a portal of entry for micro-organisms, and investigation will often disclose in these lesions the presence of staphylococci, which there is reason to believe play an important rôle in the etiology of acute articular rheumatism. Sacaze reports a case of acute articular rheumatism with relapse, in which the pains were preceded by a septic wound of the foot, in which bacteriological examination showed the presence of staphylococci pyogenes albi. In two cases of enlargement of the tonsil attacks of angina were followed by the development of acute articular rheumatism, while in two others such an angina was accompanied by rheumatic symptoms. In a sixth case an attack of acute angina, complicated by purulent otitis, was followed by cerebral manifestations and development of the symptoms of rheumatism.

PSEUDOTABES WITH ARTHROPATHY.

RUHEMANN (*Deutsche medicinische Wochenschrift*, 1894, No. 44, p. 842) has reported the case of a man, sixty-four years old, with a previous history of untreated syphilis, who, fifteen years before coming under observation, suddenly observed a tumor as large as a walnut upon the inner aspect of the left knee-joint, without inflammatory manifestations. The joint became gradually enlarged. There had never been lightning-pains, although for seven months there had been a feeling as though the chest and abdomen were encased in plaster. There was a sense of pain referred to the coccyx, associated with a feeling of oppression in the epigastrium, and aggravated by the taking of food. At times there were nausea and a tendency to vomit. For some time there had been a feeling in standing as if the soles rested upon sand, and

formication was also observed in the hands. The ears and legs were cold; the knee-jerks were preserved; there was an absence of ataxia in the hands; the station was unsteady; the right external rectus muscle was paretic, and at times horizontal nystagmus occurred; the right pupil was larger than the left; both pupils were irregular, and failed to react to light and in accommodation; there was bilateral central retinitis; sensibility was preserved, although needle-pricks were sometimes appreciated as burning, and cold was mistaken upon the lower extremities for heat; hearing was somewhat impaired; the sense of taste was perverted, all articles of food tasting badly. The patient was irritable and depressed, and had delusions of persecution. The functions of bladder and rectum were normal. Sexual vigor was impaired. The patellar tendon-reflex was preserved upon the right side, but could not be elicited upon the left on account of the condition of the knee. The case is believed to be one of spinal syphilis, with especial involvement of the posterior columns, and is noteworthy on account of the presence of arthropathy.

The Sphygmomanometer.

Von Ziemssen has recently entered a strong plea for the more general use of von Basch's sphygmomanometer (*Münchener med. Wochenschrift*, 1894, No. 43) in its present improved form. All who have used the instrument heretofore agree in regard to the value of comparative measurements on the same individual at different times, but deny that the results in different cases and in the hands of different observers can be compared. The general truth of this belief cannot be denied, since the conditions in different individuals are necessarily variable. Experiments made in von Ziemssen's laboratory on healthy persons show, however, that the variations among healthy people are small as compared with those found in the sick, especially in cases of disease of the circulatory apparatus. For example, the pressure in the temporal arteries in normal subjects varies between 80 and 120 mm. of mercury, while in cases of contracted kidney and atheroma, with hypertrophy of the heart, a pressure of from 180 to 210 mm. is common. On the other hand, cases of cardiac insufficiency show a pressure as low as 60 mm. Von Ziemssen finds that the temporal artery just above the zygomatic process is the most suitable place for taking the pressure, although both temporal and radial should be measured in making exact studies. In making observations on the same patient at different times the same place should always be chosen, being marked for the purpose. It is also of some importance to make measurements in such cases at the same time of day, as the blood-pressure shows daily variations, with a rise from morning to evening. The instrument should always be compared with a mercurial manometer, as the graduation is not always correct (it is possible the maker will still further perfect the instrument in this respect). Von Ziemssen thinks the scope of sphygmomanometry is very extensive, and likely to become even wider, though its most important place will be in diseases of the circulatory apparatus, such as heart-diseases, arteriosclerosis, and contracted kidney. In these, repeated observations—single ones are of slight value—give valuable information, useful in diagnosis and prognosis, and also in treatment. Von Ziemssen confirms the statement of von

Basch, that arterio-sclerosis can be recognized by the sphygmomanometer long before it can be discovered by other means. Cases are cited which bear out this statement, and in which preventive treatment was followed by a subsidence of the symptoms, although the high tension continued. In such cases repeated measurements are very useful in prognosis. So long as the pressure does not increase, the outlook is generally good, since the arteries can withstand a constantly elevated pressure for a long time; but a sudden increase or gradual rise of pressure is of bad prognostic significance. On the other hand, sudden and marked fall of pressure is a bad sign. The case is cited of a man with contracted kidneys from lead-poisoning, with hypertrophy of the heart and arterio-sclerosis, with a permanent pressure in the temporals of 170–180 mm. Mild uremic symptoms, such as headache, dizziness, and indistinct vision, had existed for a long time. In an attack of severe uremia, with vomiting and loss of consciousness, the pressure fell to 40–50 mm., and remained at that relatively low point during the attack. An interesting observation was made on an old man with degeneration of the heart-muscle, who had Cheyne-Stokes breathing for many weeks. On account of injury from a fall it became necesssary to tie the left temporal artery, and advantage was taken of this to measure the pressure with the manometer during both phases of the attack. At the same time the pressure in the other temporal was measured by the sphygmomanometer. The result of the comparative tests confirmed the experiments of von Basch on animals, *i.e.*, that arterial manometer and sphygmomanometer give comparable results. (In the case just mentioned the lowest pressure occurred in the period of apnœa, viz., 130 mm. The pressure rose from the beginning of dyspnœa, and at the end of that period was 150 mm. The case is to be reported in full.) Von Ziemssen intimates that in the infectious diseases observations on the blood-pressure furnish useful information for prognosis and treatment.

Although the name of von Basch gave his instrument is rather formidable, it is far preferable to the one von Ziemssen seems to be trying to substitute—the "Baschometer."

The Specific Immunity-Reaction of Typhoid Bacilli.

Pfeiffer (*Deutsche medicinische Wochenschrift*, 1894, No. 48, p. 898) maintains that the poison of typhoid bacilli resides principally in the bodies of the bacilli, and is not demonstrable in the filtrate of recent culture-media. By treatment with the vapor of chloroform, or by heating at a temperature of 54° C., for one hour, the bacilli may be destroyed without injury to their contained poison. The lethal dose of this poison for guinea-pigs is from three to 4 mg. per 100 grammes of bodily weight. In the blood-serum of animals rendered immune by means of the poison, anti-bodies appear which exert a specific bactericidal action upon typhoid bacilli. Colon bacilli and others resembling typhoid bacilli are not influenced in greater degree by such serum than by normal serum. With the aid of the specific anti-body of typhoid fever it is thus possible to differentiate typhoid bacilli from all others, including those concerning which morphological and biological study has hitherto left in doubt. Such anti-bodies are demonstrable in the blood of convalescents from typhoid fever. The etiological significance of the typhoid

bacillus for typhoid fever thus receives additional important confirmation. Experiment has shown that properly conducted immunity-methods give rise to the presence of the specific bactericidal substance in the blood in marked concentration. Observations upon human beings suffering with typhoid fever must show whether or not the use of the serum of immune animals is capable of similar bactericidal effects in man.

A Case of Hereditary Chorea.

At a recent meeting of the Johns Hopkins Hospital Medical Society Osler (*Bulletin of the Johns Hopkins Hospital*, vol. v., No. 43, p. 119) reported the case of a man, twenty-eight years old, who at the age of eighteen first noticed slight twitching of the arms and hands, afterward involving the face, shoulders, and legs. The movements were progressive in intensity and extent, and finally interfered with manual labor. For some three months speech was affected. The man had a healthy appearance, with normal temperature and pulse, and presented no abnormality of the thoracic or abdominal viscera. Almost all of the muscles were involved in the movements. Those of the face were but slightly implicated, although the angle of the mouth was occasionally twitched and the eyebrows elevated. The muscles of the trunk were in constant, irregular action, resulting in elevation of the shoulders or slight movement of the body. The arms and hands were moved in an irregular, purposeless manner, the movements closely resembling those of chorea minor, although possibly a little slower. There was no trace of incoordination on involuntary movement. If seated quietly, the legs were shifted or flexed, or the toes turned up; the gait was a little staggering; there was some hesitancy in starting, and some swaying in walking. There was neither wasting nor spasm, nor rigidity, nor increase in the reflexes. There was complaint of undue readiness of fatigue. It was learned that the patient's mother had died at the age of forty-nine years of a disease similar to his. She had had nervous twitchings of the face as long as the patient could remember. The trouble grew gradually worse, so that she could not move from her chair, and she finally became bed-ridden.

One brother died at the age of thirty-two, of influenza, after he had been afflicted for eight years with the same sort of disease as the mother. Another brother and four sisters presented no motor peculiarity, and it could not be learned that any other members of the mother's family were affected.

Numerical Changes in the Colorless Blood-Corpuscles in Croupous Pneumonia.

From a study of the blood in twenty-two cases of croupous pneumonia Billings (*Bulletin of the Johns Hopkins Hospital*, vol. v., No. 43, p. 105) arrives at the conclusion that in cases pursuing a favorable course there is a real and marked increase in the number of colorless corpuscles during the febrile period of the disease. This leukocytosis is probably present at the time of the chill, and may be very marked within a few hours. There is no correspondence during the febrile period between the daily temperature and the curve representing the number of the colorless blood-corpuscles. In

cases in which the temperature falls by crisis the curve corresponding to the number of colorless blood-corpuscles begins to fall within a few hours of the same time. The fall of the latter is only partial, however, and rarely reaches normal as soon as the temperature-curve, generally taking about forty-eight hours longer. In cases ending by lysis the two curves fall together, the temperature always reaching normal first. In cases of delayed resolution the number of leukocytes may remain elevated for days. In a majority of cases the corpuscular curve rises during the period of fall of temperature, and may reach its maximum at that time. Such a rise is only transient, however, and is soon followed by a fresh fall. In cases with extensive involvement of both lungs, the number of colorless blood-corpuscles is likely to reach a higher point than in those cases in which the involvement is only moderate. The correspondence of lung-involvement and degree of leukocytosis is, however, a very rough one. In fatal cases leukocytosis may be present or absent. In those attended with leukocytosis some other cause of death than the virulence of the bacterial poison must be sought for. In cases presenting a complete and continuous absence of leukocytosis the prognosis is, as a rule, unfavorable. Continuous absence of leukocytosis is the exception, most cases showing this condition at some period of the disease. The possibility of an absence of leukocytosis being due to extreme mildness of the disease must not be overlooked. The leukocytosis of pneumonia is a so-called pure leukocytosis, *i. e.*, dependent upon an increase in the polynuclear elements solely. In cases showing no leukocytosis the blood-conditions were found normal. Further investigations are necessary, however, before the work of previous observers can be positively contradicted. The presence or absence of leukocytosis only shows the virulence of the bacterial poison, but is not to be considered a criterion of absolute prognosis.

The Pathology of Tabes Dorsalis.

From a careful study of one old case of pure tabes, two recent cases of tabes associated with general paralysis, and one pure case of general paralysis Nageotte (*La Semaine Médicale*, 1894, No. 64, p. 522) concludes that the primary lesion of tabes consists in an intense peri-neuritis, involving the posterior root between the ganglion and the entrance of the root into the arachnoid cavity. At first proliferative, this peri-neuritis at a later stage becomes fibrous, and is followed by degeneration of the fibres of the posterior roots. The anterior roots are involved equally with the posterior, but the former more effectively resist the interstitial changes than the latter. Nevertheless, indications of this lesion are found in the peripheral neuritis of motor type observed in some cases. The morbid changes in the nerve-roots are identical with those observed in the brain in general paralysis. There is no historic evidence to prevent acceptance of the belief that in both instances the lesions are of syphilitic origin.

Variola Complicated by Acute Myelitis.

Auche and Hobbs (*Compt. Rend. Hebd. des Sciences de la Soc. de Biol.*, 1894, No. 28, p. 703) have reported the case of a woman, twenty-eight years old, who, in the stage of desiccation of an attack of discrete variola, was seized with

weakness of the lower extremities, and a day later presented complete paraplegia, with anæsthesia, absence of the knee-jerk, paralysis of the rectum and bladder, and development of a bed-ulcer. Infection of the genito-urinary tract with the bacterium coli commune ensued, and death took place seventeen days after the onset of the complicating conditions. Upon post-mortem examination active congestion and slight hemorrhagic exudation were found without the dura mater, in the lower half of the dorsal region, extending to the level of the middle of the lumbar swelling. The vessels of the pia were dilated, and the posterior aspect of the cord presented sanguineous suffusions. The lumbar enlargement in its upper portion was the seat of a large area of myelitic softening; some of the pial vessels were the seat of thrombosis, and a fibrino-purulent exudation was present upon a portion of the posterior aspect. On bacteriological examination bacteria coli communes and streptococci were found upon the pia mater at the level of the focus of myelitis.

A Fatal Case of Multiple Neuritis.

At a recent meeting of the Clinical Society of London, Churton (*Medical Press and Circular*, No. 2895, p. 454) reported the case of a rather fragile girl, fourteen years old, who, two years before coming under observation, had choreic twitching of the eyes, supposed to be due to imitation of a school-friend. Some eight months later the shoulders and head also became affected slightly. Five or six weeks after this the girl went to a school-party and became excited and tired, and afterward walked two miles, and was quite exhausted. On the following day she still felt tired, and complained of a sensation of "pins and needles" in the fingers, and was unable to play the piano. On the next day she staggered in walking, and on the following day was in bed and complaining of pains in the calves of the legs. The temperature was now found to be 103°, and the paralysis advanced; gradually use of the arms, legs, and trunk was lost, and the reflexes were abolished. Attacks of rapid breathing occurred, and the heart's action was also rapid. Sensibility was preserved, and there was no œdema. Death took place six days after the onset of the acute symptoms. Analysis of the drinking-water used showed the presence of considerable quantities of lead, and especially in that from the hot-water pipe. It was further learned that the child had been in the habit of taking tea made with water from the latter. The fatal illness was ascribed to multiple neuritis due to chronic lead-poisoning.

Sudden Death from Intestinal Hemorrhage due to Tuberculosis.

Bounaix (*Archives de Médecine et de Pharmacie Militaires*, 1894, No. 11, p. 399) has reported the case of a soldier who presented constipation, pallor, headache, and nausea, without elevation of temperature or pulmonary complication. While under observation a large amount of blood was passed by the bowel, and the general condition became distinctly aggravated. Cerebral symptoms, agitation, syncope, and delirium appeared, and led to a fatal termination. Upon post-mortem examination a succession of hemorrhagic areas were found, extending from the lower portion of the ileum throughout the entire length of the large intestine. These foci were especially numerous in

the region of the ileo-cæcal valve, where in places the mucous membrane was ulcerated; in other places were cicatrices. The mesentery was thickened; the mesenteric glands and those of the meso-colon were tuberculous.

SURGERY.

UNDER THE CHARGE OF

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TYPICAL FRACTURES OF THE RADIUS AND THEIR CAUSE.

BÄHR (*Centralbl. für Chir.*, 1894, No. 36) shows that the classical experiment of Lecomte, substantiating his claim that in these fractures the os scaphoid and pisiform do not come in contact with the ground is fallacious. This has been undisputed since 1860; but if, instead of marking the most prominent point of the volar side, which does not come in contact with the ground in these cases, but that portion which touches the paper when the arm is in extension and lies upon the flexor surface, is marked, we will find that when the arm is over-extended to the point where the hand is at a right angle, this point comes directly in contact and would naturally receive the force of the blow. Lecomte's experiment as an explanation of the mechanism of the fractures is therefore worthless. The author concludes from his observations that the typical radius fracture is not so much the result of a bending (the impression of earlier writers) as of an over-stretching of volar ligaments. Pure fissured fractures from hyper-extension can only be breaks of the volar edge of the articulating surface, or must run in a direction from above on the volar side downward to the dorsal side. All other forms of fracture can be explained by the impact of the upper carpal row upon the lower end of the radius.

THE SUBCUTANEOUS EXTIRPATION OF THE TUBERCULAR LYMPHATICS OF THE NECK.

Under this title DOLLINGER (*Centralbl. für Chir.*, 1894, No. 36) recommends the following method: The hair is shaved from the lower portion of the back of the head, and the entire head and hair carefully cleansed. The incision lies in this shaven region, beginning on a level with the external auditory meatus, one centimetre from the edge of the hair, and is a curved incision about five centimetres in length, convex below, and extending to the middle line of the neck. The incision is carried through the fascia as well.

The operator then works his way with the finger and periosteal elevator beneath the skin till the first gland is reached; it is seized with a volsella and dissected free with the finger and elevator. The head should be turned to the affected side during the operation, and any gland attached to the jugular vein should be brought to the external wound and carefully removed.

Traumatic Epilepsy.

Le Dentu gives (*La Presse Médicale*, June 9, 1894) the following as the known causes of traumatic epilepsy:

1. Fragments of bone resulting from the fracture of the skull; these may cause epileptiform convulsions immediately after the trauma.

2. Bony outgrowths due to traumatism of the cranium may cause epilepsy. This is, however, a rare event, as when a slow compression occurs the brain accommodates itself to the new conditions.

3. Meningeal cicatrices, following lacerations of the membranes by bony fragments. They are at first soft, but later are apt to become hard and adhere to the surface of the brain, when they are capable of determining epileptiform attacks.

4. It is the same with incipient chronic meningitis, which ends in sclerosis of the membranes.

5. Cysts resulting from intracranial hemorrhages occurring at the point of the fracture may cause attacks of epilepsy.

6. Arterio-venous aneurism. A case of this kind has been described by Warnots, of Brussels. He diagnosticated a blood cyst in a case of epilepsy which had been preceded by traumatism, and on opening the skull found the above lesion. The bone was not replaced, but the scalp was sutured. The patient was cured.

In operating for traumatic epilepsy it is not sufficient to remove a disk of bone; but if no lesion is found, the dura should be incised to permit of inspection of the subjacent parts, and even incision of the cortex of the brain may be practised, although the latter is generally followed by more or less lasting paralysis.

On the Mode of Death in Cerebral Compression, and its Prevention.

Victor Horsley calls renewed attention in the *Quarterly Medical Journal*, 1894, vol. ii., part iv., to the fact that in fatal cases of cerebral compression death is due to respiratory failure. This has been experimentally demonstrated by a number of investigators, among the most recent of whom are Spencer and the author. Their results led them to the general conclusion that a rise of pressure within the skull caused a slowing and diminution of the respiratory movements, and later arrest of the same.

The three common causes of increased intra-cranial tension which have been submitted to surgical treatment are cerebral tumors, hemorrhage, and inflammatory foci. In each of these sudden death is apt to occur from arrest of respiration, unless the pressure be relieved by trephining.

Four cases of intra-cranial tumor—three of the cerebrum and one of the cerebellum—are cited in illustration of the subject. In one of these death

resulted from respiratory failure on the morning of the day appointed for the operation. In the other three cases the failure of respiration occurred on the table during the operation for the relief of the cerebral condition. In each instance the patient turned suddenly white, the respiration became extremely shallow for a few breaths, and then stopped altogether. Artificial respiration was at once resorted to, and the skull rapidly and adequately opened over the supposed site of the tumor with the trephine and bone forceps. In every instance normal respiration returned, the movements being a little shallow at first, but soon assuming their customary proportions.

In experimenting on monkeys Horsley found that hot irrigations (100° to 105° F.) were very beneficial in removing the shock of the operative procedure and in restoring the activity of the respiratory centre. He therefore has an assistant irrigate the head freely with bichloride of mercury—about 1 : 10,000 —at the temperature mentioned during these operations. In this connection he expresses doubt whether the routine treatment of applying an ice bag in head injuries ought not to be given up.

Attention is directed to the class of cases in which a person receiving a blow on the occipito-temporal region falls unconscious and dies, or, as is said, falls dead. Death results in these cases, according to Horsley, from respiratory arrest, and they are eminently cases requiring artificial respiration, although this seems to have been entirely ignored heretofore.

In concluding the author states that of all of the lower nerve centres which are necessary to the functions of so-called organic life, the respiratory centre is the most sensitive to mechanical pressure and shocks; that where death results in cases of intra-cranial pressure, artificial respiration should be immediately performed, and the skull opened freely at once; that in cases of sudden shock artificial respiration should be directly instituted, and that in every case heat should be applied to the head—preferably by irrigation.

On Resection of the Cardia.

Under this heading Levy describes in the *Centralblatt für Chirurgie*, 1894, No. 31, an operation which he has devised for removing the œsophageal extremity of the stomach. Resection of the pylorus has now become a not uncommon operation, and the author has sought to confer the same benefits on those patients suffering from malignant disease of the cardiac extremity as are offered those in which the disease is located in the pylorus. So far, the operation has been performed on cadavers and dogs only. An exhaustive communication is promised later; the object of the present writing is briefly to outline his method, which is as follows:

1. Incision through the abdominal wall, beginning in the middle line at the ensiform cartilage and extending to a finger's breadth below the navel, which is passed on its left side, and from this extremity of the wound a second incision is carried at a right angle through the right rectus muscle.

2. Isolation of the cardia. The wound is held open by retractors, the liver pushed to the right and above, and the stomach drawn downward and to the left. The small curvature and the lesser omentum then become visible. The latter is then cut through on the left side (the portion adjacent to the cardia), and double ligatures applied to the arteria and vena coronaria

ventriculi sinistra as near centrally as possible, after which the vessels are divided between the ligatures.

The arteria and vena coronaria ventriculi sinistra divide into a number of branches, which are distributed to both the anterior and posterior surfaces of the left portion of the stomach, which they grasp as a clamp and add considerably to the strength of its attachment to the posterior portion of the abdominal wall. The vessels will be most easily reached high up, if at the time of applying the ligatures the assistant turns the cardia on the axis of the œsophagus toward the left.

After cutting through the bloodvessels the cardia becomes more movable. An assistant passes the flexed index finger of the left hand—with the palmar surface forward—behind and around the stomach as far as possible above the fundus, and on the tip of his finger the thin layers of tissue which are reflected from the left side of the stomach to the posterior abdominal wall are divided.

3. Isolation of the lower part of the œsophagus. The serous covering is divided with scissors around the cardia; the anterior portion of the foramen œsophageum is freed from the diaphragm; every visible vessel (mostly branches of the phrenic artery) is caught; the cardia is drawn downward and isolated.

While isolating the œsophagus one must remember that an incautious cut might easily open the pleural cavity. The œsophagus and pleuræ are so closely applied to each other that when the cardia is drawn downward it is difficult to distinguish between the two. If the tension be relaxed, however, it will be observed that in the respiratory movements the pleura is inflated sail-like, which guides the operator to the dividing line.

If this point is accurately found, the œsophagus may be easily isolated with two anatomical forceps; only at the posterior surface will the scissors be required to assist in the dissection.

4. Excision of the cardia, union of the cut surfaces. Broad strips of gauze are drawn under the cardia to prevent infection of the peritoneal cavity at the time of dividing the intestinal canal. For the same reason large pieces of gauze should be placed under the borders of the abdominal wound to close off the abdominal cavity. The points are selected at which the alimentary canal must be divided above and below the new growth, but before making the incision the œsophagus is to be stitched to the stomach on the posterior half by a double row of sutures. Then follows the excision of the cardia from the stomach, preferably not by a single cut, as a large surface would thus be produced which could scarcely be securely closed during the suturing. The incision is begun on the left half, and carried around, portion by portion, the edges of the stomach being united as fast as the incision is made. When the stomach is entirely cut through its lumen is occluded by the fingers of an assistant, and the division of the œsophagus made near the point that has been sewn to the stomach. The œsophagus is divided, a portion at a time, and united to the stomach wound as it is cut; it is important thus to retain hold of the upper cut surface until the stomach and œsophagus are firmly united. Without this precaution the divided end of the œsophagus disappears in the foramen œsophageum, and suture is then scarcely possible. The author does not pass the sutures parallel with the

long axis of the œsophagus, but obliquely, as a better hold is thus secured. The suture having been completed, the gauze is removed and the abdominal wound closed.

Perineal Displacement of the Testicle.

Pollard reports (*The Lancet*, 1894, vol. ii., No. 2) a case of perineal displacement of the testicle in a child one month old, upon which he performed an operation for restoring the organ to its normal position. The right testicle in this case occupied a position in the posterior part of the fold between the scrotum and thigh. The corresponding half of the scrotum was flattened and badly developed. The testicle was not very movable.

The operation was performed as follows: An incision was made from just below the external ring to the lower end of the testicle, which with the spermatic cord and their coverings were raised from their bed, as in the operation of castration, and turned upward as far as the external abdominal ring. An incision was next made into the lower part of the scrotum, and a sinus forceps was thrust from this wound through the cellular tissue to the upper part of the first incision, near the external ring, and its blades separated to prepare a track for the artificial descent of the testicle. Through this track the testicle was pushed down to the bed prepared for it at the bottom of the scrotum. Both wounds were closed by sutures. The infant was discharged on the tenth day after operation.

The boy was seen again seven and one-half years after the operation. The right testicle was found to occupy its natural position and to be as large as its fellow. It also responded equally with the left one to the usual method of producing the cremasteric reflex.

So far as the writer knows, this method has not been adopted before. An objection to postponing this operation until the second year of life or later is that in the malposition the testicle is apt to be arrested in its development.

A Rare Form of Tumor of the Parotid.

Mandowsky reports the following rare case in the *Aerztlichen Praktiker*, 1894, No. 32. A woman aged twenty-three years consulted Prof. Schüller on account of a hard swelling under the lobe of the right ear in the parotoid region and on the corresponding side of the neck. Nine years previously an enlarged gland appeared in this situation and was removed. A swelling soon recurred, which increased very slowly at first, but it recently took on a rapid growth, appearing at the time somewhat larger than a pigeon's egg, and adherent to the surrounding tissues. Close under this swelling was a second growth about the size of a bean.

The tumor was situated between the origin of the sterno-mastoid muscle and the ascending ramus of the jaw close under the lobe of the ear; it was adherent to the surrounding structures, especially to the parotid glands, and it penetrated deeply into the retro-maxillary space. The growth was carefully dissected out, sparing as much as possible the nerves, vessels, and muscles. It was found necessary to remove a part of the parotid, as this was involved. Besides the tumor mentioned, nine or ten bean to cherry-sized glands were removed from the region of the angle of the jaw.

The tumor was found on examination to be a gumma, having originated in a lymph gland, and affecting the parotid secondarily. The enlarged glands were the result of chronic inflammatory hyperplasia. The syphilis was found in this case to be hereditary. According to Schüller, gumma of the parotid is of the rarest occurrence. The author was unable to find mention of a single such hereditary case in works on syphilis and surgery.

The wound healed by first intention, and the patient remained healthy. Facial paralysis did not follow.

The Operative Treatment of Gastric Ulcer.

Küster reports the case of a woman aged twenty-one years upon whom he operated for frequent and severe hemorrhage from the stomach (*Centralbl. für Chir.*, 1894, No. 30). Upon exposing the stomach it was found much dilated. On incising its wall a large, deep ulcer, with undermined edges, was to be seen in the posterior surface. The ulcer, which was adherent to the pancreas, was burnt with the thermo-cautery. As the pyloric orifice was so small that it could not be found readily, it was decided to perform gastro-jejunostomy, the opening being made two and one-half inches in width. The patient recovered, and when last seen there had been no recurrence of the hemorrhages. She was able to take her usual food and to work with comfort.

Küster draws the following conclusions from this case:

1. Hemorrhage from a gastric ulcer may be arrested by a single application of the actual cautery.

2. When the gastric ulcer is situated near the pylorus, gastro-enterostomy is preferable to pyloroplasty, as the latter will not prevent cicatricial contraction and stenosis.

3. A wide anastomotic opening between the stomach and intestine is in no sense a disadvantage, but, on the contrary, will insure the patient against the risks of undue contraction later.

Ruptured Intestine from Accident; Laparotomy; Suture of Gut; Recovery.

Thomas records the following case (*British Medical Journal*, 1894, No. 1747): Woman, aged fifty-five years, while carrying a chair, inadvertently struck the door-post, bringing her abdomen into violent contact with the chair. This caused severe pain, and she vomited immediately afterward; the symptoms continued in an aggravated form. As she had been operated upon four years previously for a strangulated femoral hernia, and as a small lump was apparent at the site of the old scar, it was thought that there had been a recurrence of the hernia. On cutting down at this point the lump was found to be the sac of the old hernia; but a few ounces of putrid serum escaped, which indicated a rupture of the intestine. The femoral sac was ligated, and the wound thoroughly carbolized. A two-and-a-half inch incision was next made below the umbilicus, through which the intestine was examined. A small opening, one-quarter by three-quarters of an inch, was found on the side opposite the mesentery. This was closed with Lembert sutures. Recovery was prompt and uneventful.

The following are the interesting features of the case: 1. The slight acci-

dent. 2. The opportunity presented for examining a case of radical cure of hernia. 3. The absence of symptoms in so severe a case of septic peritonitis, only distention and tenderness being present. 4. The intense fecal odor of the serum that escaped from the femoral wound made the diagnosis of ruptured intestine certain. 5. The use of carbolic lotion (1 : 100) on account of the great septicity, without any untoward result. 6. The bowel being normal around the aperture made the suggested tearing away of bowel adherent to the site of radical cure improbable.

THE CAUSE AND TREATMENT OF THE NEURALGIAS OF SCARS AND STUMPS.

In continuation of his researches in these troublesome forms of neuralgia, WITZEL (*Centralbl. für Chirurg.*, 1894, No. 23) states that his experience in the dissection of stumps shows that the bulbous enlargement of the distal nerve-ends is normal in all cases, and is not found alone in cases where neuralgia is present. He therefore believes that these so-called neuromatas are not the cause of the neuralgic pain. He would attribute this to the fixation of the nerve preventing its movement in the direction of its longitudinal axis, and in cases which he cites he found the nerve bound down and this motion restricted. The releasing, drawing down, and excision of a portion of the nerves produced permanent relief. He advises as a prophylactic measure the drawing down and section with a sharp knife of all large nerve-trunks in amputations or disarticulations, while primary union without suppuration tends, by reducing the amount of irritation and scar tissue, to diminish the liability to neurotic involvemnt.

OPHTHALMOLOGY.

UNDER THE CHARGE OF

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DRAINAGE OF THE EYE.

PFLUEGER (Berne) holds (*La Semaine Médicale*, 14 Ann., No. 46) that drainage of the eye, with or without antiseptic injections, is indicated in grave infection of the anterior chamber, in kerato-conus, in recent detachment of the retina, and in confirmed glaucoma. To maintain drainage, he has used a small piece of rubber cut in the form of a cross, of which one short arm is, after paracentesis, thrust about two millimetres into the anterior chamber. The other arms are introduced and fixed beneath the conjunctiva. When it is necessary to practise washing out of the anterior chamber the

drain should be changed frequently. In kerato-conus, however, it may remain in position for several days. This treatment, which Pflueger states is free from inconvenience, has been most successful in kerato-conus and glaucoma.

Fatigue of the Retina or of the Occipital Lobe.

Groenouw (Breslau) has made a series of observations to test the correctness of Schiele's conclusions, that when, by long-continued perimetric examination of one sector of the visual field, the eye becomes so fatigued that the outer limits of the sector become progressively narrower, examination of the eye hitherto covered will show a decided contraction of the sector homonymous to that fatigued; and that this indicates a fatigue of the occipital lobe rather than of the retina.

Groenouw, however, finds (*Archives of Ophthalmology*, vol. xxiii., No. 3) that the fatigue curves do not run with the regularity that Schiele claims, but cross one another in manifold ways; that fatigue of one sector of a visual field is almost always accompanied by changes in the outer borders of the other sectors of the field of the same eye; that in the second eye sectors homonymous to those fatigued often did not show analogous changes, while sectors not at all homonymous to the fatigued sectors did give evidence of having been influenced. Hence he finds the evidence wanting that so-called fatigue of the retina is really fatigue of the cortex of the occipital lobe.

A New Active Method of Treatment of Acute Granular Conjunctivitis.

Wicherkiewicz (Posen) employs and recommends (*Internationale klinische Rundschau*, viii. Jahrgang, No. 33) the following plan of treatment for this disorder: Both lids are so strongly everted that the retrotarsal folds affected by the inflammatory process are fully exposed. The surface is then thoroughly cleansed by a vigorous continuous stream of 3 per cent. solution of boric acid from the undine. In very sensitive or timid persons a 5 per cent. solution of cocaine may be employed.

The surface of the conjunctival sac having been freed from secretion, an ointment of sublimate (1 to 500, or 1 to 1000) is applied with a brush or probe, and the eye is covered with a dressing soaked in a solution of tannin (10) in glycerin (100 parts). This is covered with an impervious layer and the whole dressing sustained with a flannel bandage.

When both eyes are affected one may be treated thus one day, the other the next. The treatment is not painful for the patient, nor need it be very protracted.

Influence of the Correction of Ametropia on the Increase of Myopia.

Risley (Philadelphia) reports (*Archives of Ophthalmology*, vol. xxiii., No. 3) the results of an extended statistical study of this subject. From his own case-books and the prescription-books of two large optical companies he obtained the formulas for correcting glasses of about two hundred thousand eyes that had been treated and fitted with glasses in a period of twenty years,

during which time the careful correction of ametropia had come to be generally practised in Philadelphia. These were grouped, according to the time at which the eyes had been presented for treatment and correction, into five periods. Thus grouped they show a steadily progressive decline in the number of myopic eyes from 28.43 per cent. in the first period to 16.78 per cent. in the last. He shows also that this decline is chiefly in the higher grades of myopia; while in the lowest grade, 1 D. or less, there has been a slight increase. The study separately of the statistics in the private case-books, and of those from the opticians' books shows practically the same thing in both. The results of this study, Risley believes, confirm the view he has advocated, that myopia was largely due to the strain of close work in eyes presenting other forms of ametropia, especially astigmatism.

Bacterial Origin of Descemetitis.

H. Snellen (Utrecht), having performed sclerotomy for the increased intra ocular tension which accompanies this disease, one of the characteristic dots of opacity which are situated on the posterior surface of the cornea came out, and he examined it microscopically. He reports (*Ophthalmic Review*, vol. xiii.. No. 154) that it consisted of microbes, very short bacilli that grew, but very slowly, in agar-agar. Later the other eye of this patient becoming affected, a dot obtained from it showed the same microbic composition. From another patient in a later stage of the disease a third dot was obtained. It was found to consist of cells, as described in the books, but between them were microbes similar to those seen in the first case, but which he did not succeed in cultivating. Whether all cases of descemetitis are due to the same cause, or whether in some cases the dots are a real deposit after inflammation of the deeper parts of the eyeball, further investigations must decide.

DISEASES OF THE LARYNX AND CONTIGUOUS STRUCTURES.

UNDER THE CHARGE OF

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Neuropathic Exulceration of Tonsil, Palate, and Uvula.

Dr. Benjamin F. Westbrook, of Brooklyn, reports (*N. Y. Med. Journ.*, 1894, No. 833) a unique case of multiple neuritis following intense mental application and excessive toil in a scientist and inventor, fifty-one years of age. Multiple diffuse neuritis had existed for about a year. Among other manifestations, there was the most intense neuralgia of the left side of the face, including the ear, nose, and tongue, with hyperæsthesia so pronounced that the most delicate touch gave agonizing pain. Finally, difficulty was experienced in swallowing, and commencing ulceration of the left tonsil was noted. The pain and the dysphagia increased from day to day until at the

end of two weeks liquids only could be swallowed, and only with intense pain. The ulceration had then denuded the entire buccal face of the left tonsil and had extended to the outer two-thirds of the anterior palatine fold, which it threatened to destroy, thence invading the surface of the palate almost as far as the base of the uvula. Cauterization with pure creosote produced some sloughing, and perhaps some subsidence in the rapidity of the ulceration, which still increased, the pains continuing without abatement.

It was at this time that Dr. Westbrook was first consulted. The ulcerating area involved the anterior surface of the velum as far as the middle line, and to a point about a centimetre from the base of the uvula. Quite a large notch had been produced at the junction of the left border of the uvula with the free border of the velum. The outer half of the posterior surface of the velum and posterior palatine fold was included in the ulcerative process, which had reached downward as far as the pharyngo-epiglottic fold. The color of the mucous membrane was crimson rather than scarlet, and indicative of venous stasis. The left tonsil was much enlarged, and the submaxillary glands of the left side were enlarged. The urine was hyperacid and remained hyperacid throughout the twenty-four hours. There were several evidences of diffuse neuritis in the pupils, small bloodvessels, drum membrane, carotid pulsations, and in the gums. Under aseptic topical treatment, alkalinization of urine as far as practicable, and anti-rheumatic treatment constitutionally, for details of all of which the original article must be referred to, the progress was steadily toward recovery, which became complete at the end of four weeks.

Morbid Growths of the Larynx.

Dr. H. S. Birkett, of Montreal, reports (*New York Medical Journal*, 1894, No. 833) a case of subchordal spindlec-elled sarcoma of the larynx successfully removed by thyrotomy, in a lady twenty-two years of age.

Dr. Charles H Knight, of New York, reports (*idem.*, 1894, No. 835) three cases of laryngeal neoplasm. One of these is rather rare, a case of diffuse subglottic myxoma. After partial eradication through the mouth, tracheotomy was performed and radical extirpation practised through the wound. The other two were instances of papilloma. One was a case of multiple papilloma removed with forceps, with recurrence and removal in twelve months, and a second recurrence and removal five years later.

Carcinoma of the Larynx.

Prof. Virchow, in an address before the Berlin Medical Society (*Berliner klin. Wochenschrift*, 1894, No. 31), demonstrated "preparations from two cases of carcinoma of the larynx cured by extirpation of the larynx." [It is hardly right to say that the carcinoma of the larynx was cured by the extirpation. It was bodily removed.]

In one instance the patient was cured of his carcinoma and died of pneumonia four and a half years later. This was one of Thiersch's cases operated on in 1880. No evidence of carcinoma was discoverable anywhere. The other case was one of Wolff's cases operated on in October, 1891, which died two and a half years later of metastases in the lung and in a bronchus. The preparations are minutely described, and one of them is illustrated.

Dr. Julius Wolff supplemented Virchow's remarks with a review of his own case, and then presented a general statement of cases that had lived considerable periods after the operation. Four were living respectively thirty-two months, three and a half years, four and one-third years, and four and a half years, without any signs of recurrence. Three had remained free from recurrence from four and a half to six years, and had then died of intercurrent diseases. Three had died from intercurrent diseases between twenty and twenty-two months after operation, and without recurrence. In one case of Thiersch's, and this the only one of its kind, there were, in addition to a local recurrence, metastases in other organs: cancerous lymphatic glands in the neck and in the mediastinum, and metastases the bulk of a walnut in the lungs.

Operations on the Nasal Septum.

At the last meeting of the American Laryngological Association, Dr. Thomas R. French, of Brooklyn, read a timely paper, entitled "Observations on Some of the Results of Cutting Operations on the Nasal Septum," which gave rise to animated discussion (*New York Medical Journal*, 1894, No. 835). It had reference to perforations left by attempts to cut off the thickened portions of the deflected septum and the occurrence of adhesions between the septum and the turbinated bones. It was shown that such results were not always due to lack of skill on the one hand, and that the results were not as disastrous as might be supposed on the other. Nevertheless it was admitted that in many instances these results were due to lack of judgment in operating, lack of skill in operating, and lack of care after operating.

OBSTETRICS.

UNDER THE CHARGE OF

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Rupture of the Uterus; Abdominal Section; Suture and Drainage; Recovery.

Piccinini reports in *Il Policlinico*, 1894, No. 21, a case of rupture of the uterus happening at the Trastevere Maternity in Rome. The patient was a multipara who had borne two children after prolonged and difficult labors. The child was delivered by forceps, asphyxiated, but was revived. An

examination made after delivery showed a transverse rupture of the uterus at the juncture of the lower uterine segment with the upper contractile portion. The abdomen was immediately opened, and a quantity of blood partially coagulated was sponged out. The laceration had been an extensive one, extending to the posterior fornix of the vagina. The uterus was closed by suture, the peritoneal surfaces being carefully brought together, and a large strip of iodoform gauze was carried through the lower angle of the uterine wound and into the vagina. The muscular, cutaneous, and peritoneal surfaces were sutured separately. The operation consumed an hour and a quarter. The gauze was entirely removed on the sixth day, and the patient made an uninterrupted recovery.

Ectopic Abdominal Gestation; Cœliotomy; Delivery of a Living Fœtus.

An interesting case of this sort is added to the records already existing by Werder (*Medical Record*, 1894, No. 21, vol. xlvi.). On opening the abdomen a yellowish-white cystic tumor was exposed; on opening the cyst, the child at once presented, and was rapidly delivered by the feet. The cyst was adherent to numerous loops of intestine, and terminated between the folds of the broad ligaments near the uterus. An attempt to extirpate the cyst resulted in severe hemorrhage from a partial separation of the placenta, which was spread out over the spinal column and the right posterior wall of the pelvis. The ovarian artery and branches of the uterine artery were caught by clamps, after which it was comparatively easy to remove the placenta without hemorrhage. The free portion of the cyst was excised, the ovarian and uterine arteries tied, and the remainder of the sac was drawn together by silk sutures; the cavity of the cyst was packed with iodoform gauze, and the abdominal wound closed to the gauze. The child was resuscitated, but died on the third day after birth, with rapid breathing and fever. No autopsy was obtained. The mother made a good recovery. Werder has collected and tabulated seventeen cases, including his own.

Traumatic Hæmatothorax in a Newborn Infant.

In the *Zeitschrift für Geburtshülfe*, 1894, Band xxx., Heft 2, Gebhard reports a case of a child born in breech presentation, the mother's pelvis being slightly larger than the average. During the birth the fœtal heart-sounds became slow, and the physician in attendance rapidly extracted the child, the extraction occupying three minutes. The child was a male and well developed; it was born asphyxiated, and resuscitated, Schultze's method being employed among others for this purpose. Three hours after birth the child died. Post-mortem examination revealed fluid blood in the right pleural cavity, with compression of the right lung, and further examination showed that during the extraction the chest of the child had been brought with such force against the mother's sacrum as to cause the partial laceration of the pleura and the hemorrhage in question. This injury was further increased

by the resuscitation by Schultze's method, the pressure of the hands of the operator while swinging the child increasing the injury already done.

Chlorosis and Eclampsia.

An interesting observation, throwing light upon the causation of eclampsia, is made by Sécheyron (*Archives de Tocologie*, 1894, No. 11). The case was that of a young woman, aged twenty-one years, who suffered from chlorosis before her marriage. When pregnancy occurred there resulted a progressive failure of digestion and assimilation, with obstinate constipation, headache, and finally eclampsia. She was delivered of a dead child at eight months. Although efforts had been made to move the bowels during pregnancy, they had been unsuccessful, owing largely to the patient's refusal to submit to treatment. After delivery the patient was treated by enteroclysis, with the result of removing a mass of exceedingly fetid matter from the bowel. A solution of naphthol, 1 to 2000, was employed as an intestinal antiseptic.

Appendicitis During Pregnancy.

Mundé describes, in the *Medical Record*, 1894, vol. xlvi., No. 22, a case of pregnancy complicated by appendicitis. The diagnosis was difficult by reason of the absence of localized pain, the pain from which the patient suffered being referred to the lower portion of the abdomen, and not to the region of the appendix. Labor resulted in the birth of a dead child, which had been dead about twenty-four hours. The placenta was readily delivered, and there was no post-partum hemorrhage, but the patient went into a semi-delirious condition, and appeared much prostrated. She had suffered from fever, with rapid pulse before and during her labor. Following labor, the abdominal tenderness, which had been very great and diffuse, subsided sufficiently to reveal decided dulness in the right iliac region. *Per vaginam* no exudate could be found in the pelvis. Appendicitis was diagnosticated, and after waiting for the abscess to become encapsulated, it was opened and drained; the mother made a good recovery.

The Influence of Prolonged Labor on Puerperal Temperature.

In the *Transactions of the London Obstetrical Society*, 1894, p. 238, Giles describes his researches in 600 cases of labor with a view to determine the effect upon the temperature of the duration and character of the labor. He finds that in normal cases labor produces but a very slight rise of temperature, the length of the first stage of labor affecting the temperature of the patient but very little. If the second stage is prolonged, however, the temperature rises in proportion to the length of this stage. The time of day at which delivery takes place has very little influence on the patient's temperature. The administration of chloroform during the second stage commonly results in a low temperature after delivery, and the same is true of the use of forceps under chloroform. It is interesting to observe that in twelve cases of normal labor in which the second stage averaged but thirty-five minutes, the giving of an intra-uterine douche raised the temperature to 99.4° F.

Symphysiotomy.

Symphysiotomies are reported, among others, by the following operators: Assistant Surgeon Shah (*Indian Medico-Chirurgical Review*, 1894, No. 8) operated upon a Hindu woman, aged twenty-two years, who was in active labor. The membranes had ruptured, all the amniotic liquid had escaped. The pelvis was not accurately measured, but the promontory of the sacrum was found projecting further than normal; the conjugate diameter is given as about 2¾ inches. The coccyx was immovable. The patient had already borne two children, both deliveries having been spontaneous. After the second birth the patient became a cripple from rheumatism. The operation was performed by inserting a pointed bistoury, and then a probe-pointed bistoury, severing the joint. The sub-pubic ligament was divided by a herniotomy knife; the operation was done subcutaneously, the tendons of the recti muscles being also severed. The pubic bones separated two inches, and the child was born a half-hour later in spontaneous labor. The child was stillborn, and although it subsequently breathed, it perished soon after with high temperature and difficult breathing. After the expulsion of the placenta the womb contracted well, but a sharp attack of hemorrhage followed. The patient was treated by a tight pelvic bandage, and the free use of iodoform over the wound. She gradually made a good recovery, and three weeks after labor was in good condition.

Garrigues (*Medical Record*, 1894, No. 19) performed symphysiotomy to deliver a patient whose labor was complicated by a pelvic tumor. The child was delivered by forceps, and was asphyxiated, but revived. The pubic bones separated five inches after the delivery. The patient was treated by immobilization of the pelvis with rubber adhesive plaster, and iodoform-gauze drainage of the wound. Pus formed in the wound, which required the use of a thin drainage-tube. Three weeks after delivery the tumor in the pelvis had disappeared, and on the thirty-fourth day after the operation she left the hospital. Three months after delivery the child was in excellent condition; the mother could lift her child, and walked with a waddling gait, and the examination showed cystocele and occasional pain in three joints of the pelvis. The upper portion of the ends of the pubic bones was in apposition, but the lower portions were asunder a half-inch.

Harris (*American Journal of Obstetrics*, 1894, vol. xxx., No. 6) reports a symphysiotomy in a primipara with 7½ cms. antero-posterior pelvic diameter. Symphysiotomy was performed by cutting in the median line, 4 cms. above the symphysis, to within 1 cm. of the clitoris; the joint was divided from before backward with an ordinary scalpel, and the sub-pubic ligament with a blunt-pointed bistoury. The symphysis separated about 6 cms. A living child, weighing ten pounds, was delivered by forceps; gauze drainage was employed at the lower angle of the wound, with rubber adhesive plaster to immobilize the pelvis. The patient made an uninterrupted recovery.

Harris performed symphysiotomy later in a primipara, aged twenty-five years; the os dilated well, but the occiput persisted in rotating posteriorly. The forceps was applied, but without success. The conjugata vera was about 7 cms.; distance between the anterior superior spines, 22 cms. The left leg was 2 cms. shorter than the right, and the line of the symphysis 1 cm. to the

left of the mid-line. The operation was performed as in the previous case, and the symphysis separated 5 cms. The separation was due chiefly to motion of the right side, the left half moving but little. Great difficulty was found in detaching the suspensory ligament of the clitoris, which was very firm, and its base almost cartilaginous. Very little hemorrhage followed the operation. The child, weighing eight pounds, was delivered by forceps. The left side of the pelvis not yielding readily, its sharp inferior corner left a groove over the right frontal region of the child's head; the most serious complication was that this corner perforated the anterior wall of the vagina as the head passed through. The external wound was closed, an iodoform gauze drain left in its lower angle, and the vagina at the seat of the perforation packed with iodoform gauze. This patient made a good recovery, and has now, eight weeks after the operation, no trouble in walking; there is firm union of the symphysis; no pain or soreness; no prolapse of the anterior wall of the vagina. The child is living and well.

At the meeting of the New York Obstetrical Society, October 2, 1894, JARMAN reported a symphysiotomy in a patient with generally contracted pelvis, the internal conjugate measuring three and one-quarter inches. The child was delivered by version, which was exceedingly difficult. During extraction the bladder was forced against the sharp edge of the pelvic bones, and lacerated. The bladder was drained for two days by a tube passed through the wound and into the bladder. The patient made an uninterrupted recovery, and was able to nurse her child. The infant was a healthy male, weighing six pounds twelve ounces.

GYNECOLOGY.

UNDER THE CHARGE OF

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CYSTS OF THE CORPUS LUTEUM.

FRANKEL (*Archiv für Gynäkologie*, Band xlviii., Heft 1) has made careful microscopical studies of these cysts, which are distinguished by the following peculiarities: Macroscopically the cyst-wall presents a yellowish color, is thrown into folds, and can be peeled off from the subjacent tissue. The contained fluid is either thin or syrupy in consistence, and of a reddish-brown or yellow color. Under the microscope the lining membrane is seen to be rich in capillaries, between which lie large multi-nucleated pigment-cells and groups of leucocytes.

That these cysts possess considerable clinical as well as pathological interest is evident from the number of cases in which they have given rise to such symptoms as to demand surgical interference.

It is not always possible to decide whether the accompanying pelvic peri-

tonitis is the cause, or the result, of the cyst-formation. The writer decides from his investigations that large, apparently unilocular, ovarian cysts may undoubtedly arise from the confluence of adjacent dilated follicles. A combination of multilocular glandular cystoma with cysts of the corpora lutea has also been noted.

Classification of Uterine Sarcomata.

Pick (*Ibid.*) concludes a lengthy paper on this subject with the following résumé. The transformation of uterine fibro-myoma into sarcoma is due to a direct change of smooth muscle-fibres into sarcoma-cells, as well as a development from the connective tissue or vessel-walls of the primary growth. Neoplasms having the former origin are to be regarded as true mixed growths (*myoma sarcomatosa*). Œdematous fibroids are identical in structure with myxomata, though such œdema may give rise to a true metaplasia, dependent upon the capacity of the young cells for secreting mucin. Œdema and myxomatous changes may coexist in the same tumor. Papillary sarcoma found in the cervix uteri, as well as in the vagina, in children, is distinguished by its resemblance to a bunch of grapes, its development from the mucous membrane, and clinically by its extreme malignancy. This is not to be regarded as a separate variety of myxo-sarcoma. Its grape-like development is due simply to the presence of pre-formed cavities which become dilated. It is different from the dropsical forms of sarcoma found in the uterine body, which do not originate or extend in the mucosa like the *sarcoma botryoides* of the cervix and vagina.

Hyaline degeneration is frequently observed in uterine sarcoma, but it seems to bear no relation to other degenerative processes.

Carcinoma Developing from the Chorionic Villi.

Fränkel (*Ibid.*) describes a fatal case of malignant disease of the corpus uteri following the removal of a vesicular mole. The growth had a papillary form, invaded the deeper tissues, and gave rise to metastases. Microscopically it was shown to have originated from the remnants of chorionic villi left after removal of the mole, since the structure of the uterine glands was still recognizable, and its histological appearance was quite different from that of cancer of the corporeal endometrium. This is an entirely different form of malignant disease from the *sarcoma deciduo-cellulare* of Sänger, but bears a close resemblance to Gottschalk's sarcoma of the chorionic villi. Meyer has also described a case of epithelioma of the villi.

The Results of Castration for Fibro-Myoma.

Hermes (*Ibid.*) reports seventy-eight cases from the Halle Clinic, with a mortality of about six per cent. In only two instances were the ovaries found to be healthy. The cases selected for the operation were those in which there was an interstitial tumor, not extending above the umbilicus, and causing hemorrhage and pressure-symptoms which could not be relieved by other methods of treatment. If it is found after opening the abdomen that the ovaries cannot be thoroughly removed, the writer thinks that it is better to

resort to a more radical operation. As regards the results, the hemorrhages ceased entirely in forty cases, menstruation persisted irregularly in nine, and at regular intervals in two. In forty-five the tumor diminished in size, in two it was unchanged, and in one it continued to grow.

Vaginal Hysterectomy with Dry Asepsis.

Kurz (*Münchener med. Wochenschrift*, 1894, No. 48) recommends highly the use of dry asepsis in vaginal extirpation of the uterus, with complete closure of the peritoneal cavity afterward. He cleanses the vagina beforehand with soap and water, and uses no irrigation subsequently, dry gauze being employed for sponging. No pad is introduced into the peritoneal cavity when it is opened, as the patient's hips are elevated so as to prevent prolapse of intestine. All ligatures (silk) are cut short, and the peritoneal and vaginal wounds are closed, the edges of the two having been previously united in the usual manner during the operation.

The writer believes that the use of irrigation after the peritoneum is opened is dangerous, since it either irritates that membrane if an antiseptic fluid is used, or fragments of cancerous tissue may be carried into the cavity. By the use of dry gauze the field of operation can be kept much clearer than is possible under continuous irrigation. If the hips are elevated, it is unnecessary to introduce a pad into the peritoneal cavity at all.

Finally, since vaginal hysterectomy is practically a cœliotomy performed per vaginam, the ideal method in the vaginal, as well as in the abdominal operation, would seem to be to cut the ligatures short, and thus to provide against the possibility of secondary infection, which may occur if they were allowed to hang into the vagina. For the same reason the wound is closed without drainage, the latter being, as the writer properly remarks, "a thing which we have learned to regard as of very doubtful value."

In a case of extensive cancer of the cervix involving the vaginal fornix the writer states that he operated according to this method only four weeks after delivery, and the convalescence was so rapid that the patient was able to leave her bed at the end of a week.

Contracted Bladder in Women.

In a paper on this subject (*Medical Chronicle*, November, 1894) Sinclair describes an obstinate form of frequent micturition due to diminution in the normal capacity of the bladder, which resists all medicinal treatment. He treats these cases by gradual dilatation of the bladder, by filling the organ with warm boric acid solution, slowly injected into it from an ordinary irrigating-jar. As much fluid is introduced as can be borne, and the patient is encouraged to retain it as long as possible. The treatment is continued at intervals of two or three days, until she is able to retain her urine for the usual time. The writer denies that there is any other satisfactory cause of the symptom to be found in these cases—either accompanying disease of other pelvic organs, an abnormal condition of the urine or hysteria, masturbation or sexual continence, as suggested by Skene.

[As the writer promises a more extended paper on this subject, we would

call his attention to the fact that this condition was described several years ago by Dr. H. Marion Sims in a paper read before the New York Obstetrical Society, who also treated it successfully by the identical method of gradual hydrostatic pressure.—H. C. C.]

Dilatation of the Cervical Canal with Drainage-tubes.

Richard Braun (*Wiener klin. Wochenschrift*, 1894, Nos. 46 and 47) describes the following method of gradual dilatation which he has practised successfully. After thorough disinfection of the vagina, a piece of aseptic rubber tubing is stretched over a sound, and is thus passed through the os internum. The sound is then slipped out and the tube is left *in situ* for twenty-four hours, when it is removed and one of larger size is introduced. In two or three days considerable dilatation of the cervical canal is obtained, without pain to the patient and with no risk from the retention of secretions, as when an ordinary tent is used. Moreover, the flexible tube adapts itself to the shape of the canal, and a flexed uterus is not forcibly straightened. The writer regards his method as particularly useful in the induction of premature labor and in cases of incomplete abortion with rigid cervix.

PÆDIATRICS.

UNDER THE CHARGE OF

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The Bacteriology of Suppurative Otitis Complicating Scarlatina.

Bloxall (*British Medical Journal*, 1894, ii., p. 116) presents the results of a bacteriological study based upon examinations of the discharge in fourteen cases of otitis complicating scarlatina. The table shows that the shorter the interval between rupture of the membrane and the examination of the discharge, the more the pyogenic cocci predominate over rod forms. Cases examined on the first day showed almost pure cultures of cocci, while in the cases taken after a few days the presence of adventitious organisms, such as yeasts and sarcinæ, was very marked. But even in the earliest cases the cocci were not in pure culture, but were associated with bacili and, in one case, with spirilla, which had probably ascended from the mouth and air-passages.

In the fourteen cases the organisms were found as follows: Streptococcus pyogenes, 12 times; bacillus striatus albus, 9 times; staphylococcus pyogenes albus, 8 times; staphylococcus pyogenes aureus, 5 times; micrococcus albus liquefaciens, 3 times; bacillus acidi lactici, twice; bacillus subtilis, bacillus pyocyaneus, bacillus tuberculosis, each once. This list shows the frequency

of the streptococcus pyogenes, and that, contrary to Kanthack's investigations on ordinary cases of middle-ear disease, the diplococcus pneumoniæ was never found. It may be stated in this connection that great care was directed to the discovery and recognition of the diplococcus.

The conclusions from this study, therefore, show that the streptococcus pyogenes is the most potent factor in the etiology of otitis media of scarlet fever; that the less chance there is of contamination from the outer air through the external orifice, the more the pyogenic cocci predominate over rod forms, but that prior to perforation the occurrence of such organisms is not precluded, since they may ascend by the Eustachian tube from the mouth; that next to the streptococcus the most important organisms are the staphylococcus albus and aureus; and, finally, that apparently the diplococcus pneumoniæ of Fraenkel or the bacillus pneumoniæ of Friedländer does not play such an important part in the otitis media of scarlet fever as in that due to other causes.

Strangulated Hernia in a Baby of Four Weeks.

Havemann (*Deutsche medicinische Wochenschrift*, 1894, No. 34) reports a case of strangulated inguinal hernia in an infant four weeks old. The patient was a boy with a congenital scrotal hernia of the right side. Symptoms of strangulation began suddenly with vomiting and arrest of the bowels, the fecal movements being replaced by evacuations of mucus mixed with a relatively large quantity of blood. There was probably much pain, for the baby cried incessantly. When the author first saw the child, about forty-eight hours after the beginning of acute symptoms, taxis failed, so that operation was determined upon, but owing to lack of facilities had to be postponed till the next day. Recovery was uninterrupted.

The author insists upon the importance of the bloody stools in this condition. The flow of blood from the anus appeared with the beginning of acute symptoms, and promptly disappeared after the operation; it therefore depended upon the strangulation. The blood was venous in appearance, and came evidently from the intestine subjacent to the strangulation, and very probably from the hemorrhoidal veins which open directly into the inferior vena cava.

Serotherapy in Diphtheria.

A note in the *Revue Mensuelle des Maladies de l'Enfance*, Nov. 1894, p. 642, calls attention to an important point to be observed in cases in which the serum treatment is used. This is the observation that the serum treatment considerably increases the patient's intolerance to chemical toxics, especially the commonly-used antiseptics. In such a case requiring intubation occurring in the service of Dr. Moizard, the tube used had been washed in a 5 per cent. solution of carbolic acid. Its introduction was followed by darkening of the urine, lasting for two days. In the same way cases of intoxication by corrosive sublimate in glycerin have occurred among children treated by the antitoxine, an accident which, whatever the strength of the solution, has never been observed in the many cases previously treated by Moizard.

The Rash in Varicella.

Lorrain (*Annales de Médecine*, 1894, p. 169) publishes a study under this title based upon seventeen collected observations. According to his results, a rash may precede, accompany, or follow the vesicles, but most often precedes them. When it follows an initial eruption of vesicles it often announces another. (Gillet.) This rash develops in a few hours; it is sometimes scarlatiniform, occupying the surfaces of the abdomen, trunk, and lower limbs; at other times morbilliform, and occasionally unites the characteristics of the rashes of both diseases. Fever can be high (105⅘° F., in a case reported by Thomas), but angina is always wanting. The rash rarely lasts more than two days, though five days was the duration in a case observed by the author.

The diagnosis is difficult only when the rash precedes the vesicular eruption, and then, perhaps, until sufficient time has elapsed to exclude a variolous type of development in the vesicle.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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Mallein.

Although the "tuberculin" of Koch failed to realize the expectations of those who hoped to find in it a cure for tuberculosis, there could be little doubt that the characteristic febrile reaction induced by it in tuberculous subjects only had a certain scientific if not a very practical value as a means of diagnosis. But no truth can long remain barren, and Kalning, following up the clue, succeeded in a few months in obtaining from artificial cultures of intensified bacilli of glanders a substance which, acting in like manner, detects with almost unerring certainty the presence of that disease, even in those cases of chronic farcy in which deep-seated glands only are implicated and the general health of the animal is apparently unaffected. This reaction, which is independent of and not obscured by any pyrexia already present, whether due to the disease in question or to concurrent febrile processes, is not manifested after injections of mallein in the course of any of those, as tuberculosis, glandular affections, lymphangiomata, sarcomata, catarrh of antrum, pneumonia, etc., which simulate either the acute or chronic forms of glanders or farcy. It is quite characteristic, commencing in four, six, or eight hours after the injection, culminating in ten, twelve, or fourteen, and subsiding between the sixteenth and twentieth, or in some cases not until twenty-four to thirty-six hours. The maximum temperature of 39.5°–40° C. (= 95°–

104° F.) once reached is maintained without oscillations for from six to twelve to eighteen hours, but no rise of less than 1.5° C. (= 2.7° F.) can be considered as more than ground for suspicion.

Drs. Hutyra and Preisz, of Buda, have collected reports of 473 injections performed in Germany, in 260 of which there was no reaction, and in 213 some. In 208 of these post-mortem examinations were made, glanders being found in 199; in the remaining 7 acute pulmonary tuberculosis and pneumonia, with suppuration of the peri-bronchial glands (two cases of each), would account for the pyrexia in four, while in none of the seven was the reaction typical.

A series of 162 experiments performed at Montoise, in France, gave somewhat discordant results, probably through some errors in operation or in observation. For while of 143 horses in which positive effects were obtained, 142 were found to be infected, 12 out of 19 giving "negative or indistinct results" were so too, and 7 only free from disease. Meszaros operated on 37 horses, 8 of which reacted to the extent of 1.9° to 2.9° C. (3.4°–5.2° F.), and all were found glandered. Kopeczky injected 312 horses in a regiment of Hussars, obtaining reactions in 27, in all but one over 1.5° C. (2.7° F.). All were found diseased, though two only looked in any way suspicious, one having a cough and the other a slight glandular swelling in a forefoot.

Schindelke injected 144 horses with Forth's mallein in doses of various strengths, obtaining the following results: In 63 the rise of temperature was from 2° to 3.6° C. (3.6°–6.5 F.), and 62 were found to be diseased. In 63 the rise was 1.3° C. to 1.9° C. (2.3°–3.4° F.), with 36 diseased and 27 healthy. In 14 the rise was only 0.7° to 2° C. (1.2°–3 6° F.), and only 1 infected, while 4 gave no reaction whatever, and all proved to be perfectly sound.

In another classified series of 486 injections, autopsies were made in 126, in which reaction was observed with similar results: of 22 with a rise under 1.5° C. (2.7° F.), 8 were diseased, 13 healthy, and 1 doubtful. Of 15 with a rise between 1.5° and 2° C. (2.7°–3.6° F.), all were diseased, and of 89 in which the rise exceeded 2° C. (3.6° F.) 84 were diseased and 5 not, but the observation in 4 of these was disputed, and the pyrexia in the other was far from typical.

It is thus evident that when a characteristic reaction involving an elevation of 2° C. above the normal is observed, glanders in some form is almost certainly present, and when the rise exceeds 1.5° C. there is a strong presumption, and the animals ought at least to be isolated and kept under the closest observation, while a rise of 1° C. should be looked on as suspicious.

Mallein has not as yet been obtained in a state of chemical purity or even isolated, but is present in very various proportions in different culture fluids. Forth's mallein, which is ten times as strong as some samples, and the dose of which is but 0.01 gr., is thus prepared. The virulence of the bacilli of glanders having been greatly intensified by their being passed through a succession of guinea-pigs, cultures are made on potato between watch-glasses. When these have become perfectly black they are put into flasks and just covered with a solution of equal parts of glycerin and distilled water, with 3 to 5 per cent. of sublimate, and kept for ten to fourteen days in a warm chamber at a temperature of 37.5° C. (99.5° F.). The fluid is then strained through filtering paper and sterilized by an hour's exposure to a steam current.

The filtrate, a dichroic, *i. e.*, brown-green fluid, will remain sterile, and retain its activity for six months at least, though the bottle be opened frequently.

The dose is 0.3 to 0.5 c.cm. diluted to 3 c.cms. with 5 per cent. phenol water. This mixture is very stable, and the mallein may with advantage be sent out in this form.

Stains for Amyloid.

The iodine-test has always been the most reliable means of detecting amyloid degeneration in tissues, but its delicacy is often obscured by the color which is imparted to the normal tissues by the iodine, particularly when the degenerated areas are small or the sections are thick. To overcome this difficulty slight modification of the usual method has been suggested by Galeotti (*Centralbl. f. Allg. Path. u. Path. Anat.*, 1894, No. 7). Sections of the alcohol-hardened tissues, thoroughly washed in water to remove all alcohol, are immersed for twenty minutes to half an hour in a 5 per cent. solution of potassium iodide, are then rather quickly washed in water, after which they are transferred to chlorine water. The chlorine replaces the iodine in the salt and the iodine is liberated, staining the amyloid of a deep mahogany-brown, while the tissues remain almost colorless. Finally, the sections are again washed in water and are preserved in glycerin.

Thionin has recently been recommended by Kantorowicz (*Centralbl. f. Allg. Path. u. Path. Anat.*, 1894, No. 3) as a delicate stain for amyloid. The sections are immersed in a saturated acqueous solution for from three to five minutes, are washed and dehydrated in alcohol, cleared in anilin-oil-xylol, and mounted in balsam. The amyloid areas are lilac, the tissues blue. Mucin stains red by this method.

Erratum.—Vol. CIX., No. 1, page 80, eighth line from bottom, for *mercuric* read *meconic*.

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